AVIATION WEEK

SEPT. 4, 1950

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Thomas M. Self .... Los Angeles

Executive and Editorial Offices: 330 West 42nd St., New York 18, N. Y., Phone Longacre 4-3035; National Press Bldg., Washington 4, D. C., Phone National 3414.

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Names...
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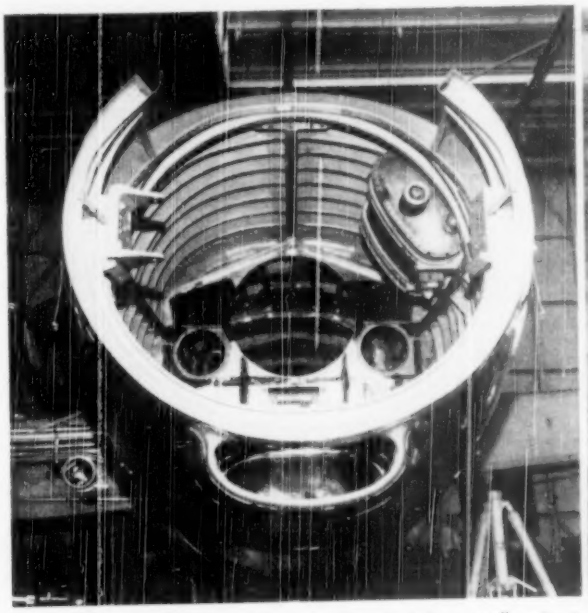
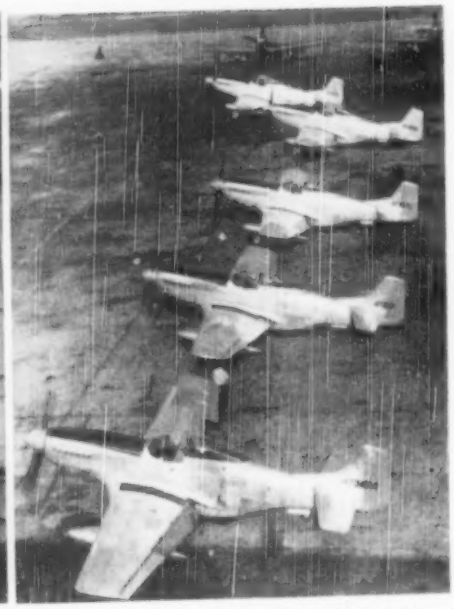
News Picture Highlights . . .



T-38 NEST—Detailed view of Convair Turboliner nacelle prior to installation of Allison T-38 turboprop reveals one of the three engine mounts on port side. At top is monorail for positioning the engine. At right is ten-gallon self-pressurizing oil tank.



MUSTANGS FOR EUROPE—First batch of F-51Ds reconditioned by Lockheed Aircraft Service at MacArthur Field, L. I., warm up before mass delivery under European Defense Assistance Pact.

ROOM WITH A VIEW—Fairey 17's (left) unusually clear field of vision is enjoyed by Group Capt. Gordon Slade, chief test pilot for Fairey Aviation Co., as he flies the prototype anti-sub and torpedo-bomber. The craft, powered by an Armstrong-Siddeley Double Mamba turning contra-rotating props, recently made the first landing of a turboprop plane on a carrier. Points of interest include the engine exhaust outlet just behind the wing, the retracted radome, and the "sting"-type carrier cable arrester hook.

LEAVING TERRA FIRMA—Fairchild XC-120 Pack Plane (right) strikes an unusual attitude during its first takeoff at Hagerstown, Md. Forward wheels of the quad-gear have just cleared the runway as the big 64,000-lb. cargo plane heads for the sky. The first flight, which lasted 45 min., was made with the detachable cargo pod of 2700-ft. capacity attached. Following extensive tests, the plane will be flown minus the pod. The cargo section, which can be detached in a matter of minutes, can be outfitted as a ready-to-use shop, control tower, offices, first aid station, fuel dispenser, or used for many other special purpose duties.

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AVIATION CALENDAR

Sept. 5-7—Aircraft Spark Plug and Ignition Conference, sponsored by Champion Spark Plug Co., Hotel Secor, Toledo.

Sept. 5-10—Eleventh flying display and exhibition, Society of British Aircraft Constructors, Farnborough airfield, England.

Sept. 7—Pratt & Whitney distributor operation and maintenance meeting, Pacific Automotive Corp., Linden, N. J.

Sept. 9-10—Third annual convention of the California Wing of the Air Force Assn., Arrowhead Springs Hotel and Spa near San Bernardino, Calif.

Sept. 10-14—Instrument Society of America instrument conference and national exhibit, the Coliseum, Houston, Tex.

Sept. 12-14—Conference on ground facilities for air transportation, Massachusetts Institute of Technology, Cambridge, Mass.

Sept. 18-22—Fifth national instrument conference and exhibit, Memorial Auditorium, Buffalo, N. Y.

Sept. 19-21—Joint meeting on navigation and electronics, sponsored by the Institute of Navigation, the Radio Technical Commission for Aeronautics and the Radio Technical Commission for Marine Services, Hotel Statler, N. Y. C.

Sept. 25-27—1950 national electronic conference, Edgewater Beach Hotel, Chicago.

Sept. 28-30—Aeronautic meeting and aircraft engineering display, Society of Automotive Engineers, Hotel Biltmore, Los Angeles, Calif.

Sept. 28-30—14th annual convention of International Northwest Aviation Council, Sun Valley, Idaho.

Oct. 9-12—Autumn meeting of National Academy of Sciences, General Electric Co. research laboratory, Schenectady.

Oct. 9-12—Fifth annual industrial packaging and materials handling exposition, Convention Hall, Philadelphia.

Oct. 12-13—1950 conference on airport management and operations, Max Westheimer Field, North Campus, University of Oklahoma, Norman, Okla.

Oct. 16-20—1950 annual general meeting of the International Air Transport Assn., Fairmont Hotel, San Francisco.

Oct. 24-25—Third biennial Materials Handling Conference, sponsored by Westinghouse Electric Corp., Hotel Statler, Buffalo, N. Y.

Oct. 25-26—Flight Safety Foundation annual Safety Seminar, Denver, Colo.

Nov. 29-Dec. 1—Eighth annual meeting of Aviation Distributors and Manufacturers Assn., Ambassador Hotel, Los Angeles.

Dec. 16—14th Wright Brothers Lecture, Institute of Aeronautical Sciences, U. S. Chamber of Commerce Auditorium, Washington, D. C.

Jan. 29-Feb. 1, 1951—19th annual meeting of the Institute of Aeronautical Sciences, Hotel Astor, N. Y.

May 30-Sept. 9, 1951—World Transportation Fair, Santa Anita Park, Arcadia, Calif.

PICTURE CREDITS

7—(Top) Convair. (Center) Flight. (Bottom) USAF. 27, 28, 29—McDonnell Aircraft.

NEWS DIGEST

DOMESTIC

Convair XF5Y-1 set an endurance mark for turboprop airplanes recently when it stayed in the air 5 hr. and 6 min. over the Southern California coast. The plane's previous mark had been 2 hr. and 20 min. earlier this summer.

TWA plans an early start on its recently granted routes to London and Frankfurt, with service scheduled to begin Sept. 30. The two points were recently granted the airline in CAB's Pan American-American Overseas decision.

Efforts to undercut CAB's authority to determine routes and mail pay failed in Congress last week. One proposal would have banned Post Office funds "over any route or by any means determined by the Postmaster General to be uneconomic"; the other would have required the Post Office to allocate its annual budget on a monthly or quarterly basis. If this had been adopted mail rates set by CAB would have been meaningless as the Post Office could not enter into contracts exceeding its monthly or quarterly allocation.

CAA budget for fiscal 1951 of $230 million, and CAB budget of $3.5 million were approved by Congress for fiscal 1950. CAA had $206 million, and CAB $3.6 million.

Wrong Chamber

Dayton—They say it really happened last week at the Contractor Relations office at Wright Field.

An anxious business man stood in line at the receptionist's desk (See page 13), and listened as she directed manufacturers' representatives ahead of him to various offices and assignments. When his turn came, he voiced his query:

"Do we facilities . . . ?"

The receptionist began to explain:

"All plumbing equipment is purchased through local procurement at the various Air Force bases. If you will contact the local procurement Contracting Officer at your local Air Force base he will—"

But the man interrupted:

"Lady, never mind all that, please. Just tell me, where is the men's room?"

Aircoach Transport Assn. elected Amos Heacock president. The organization is composed of nonsubsidized airlines in the coach trade. Heacock is president of Air Transport Associates, Seattle.

Dr. Fred L. Whipple has been named a member of the Panel on the Atmosphere, the Committee on Geophysics and Geography of the Defense Department Research and Development Board. Whipple, an astronomer at Harvard University, replaces H. W. Wells.

Brig. Gen. Clayton C. Jerome, tactical support aviation expert, has been named director of Marine Corps aviation. He succeeds Maj. Gen. William J. Wallace, who assumes command of the First Marine Air Wing, El Toro, Calif.

Robert B. Farquharson, Jr., assistant to the sales manager of Pratt & Whitney division, United Aircraft Corp., died Aug. 25 of poliomyelitis at Hartford, Conn. He was 40 years old. He formerly was West Coast representative and Dayton representative of P&W.

Identification passes for all U.S. pilots will be required soon as one of the first steps in a civil aviation mobilization plan that was near approval last week. The plan follows in most respects the outline submitted to CAA's Aviation Development Advisory Committee by civil aviation organizations (AVIATION WEEK Aug. 21), and is expected to be okayed with only minor changes. It calls for two sets of civil aviation security controls: one to take effect immediately, the other to be used in case of all-out national emergency.

FINANCIAL

The Sperry Corp. declared a quarterly dividend of 50 cents a share, payable Sept. 25 to stockholders of record Sept. 8. This is the first payment under a new policy of considering dividend declarations quarterly. The corporation previously had paid dividends only semi-annually.

Stewart-Warner Corp. declared a dividend of 25 cents a share on the $5 par value common stock, payable Oct. 7 to holders of record Sept. 15. This is the third dividend of the same amount this year.

INTERNATIONAL

Avro Canada's CF-100 Canuck flew from Toronto to Boston, 444 miles, in 48 min. for an average speed of 555 mph.

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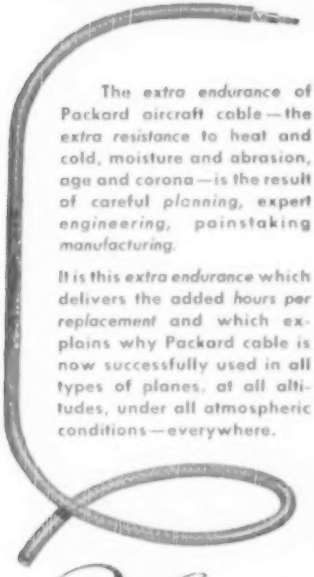

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WHO'S WHERE

In the Front Office

Gunner E. Gunderson has been named president of the Bendix Foote Gear Works, Chicago. Formerly vice president, Gunderson has been with the company since it started in 1924. Other officers elected were **E. J. Lindgren**, vice president (with the concern over 17 years), and **H. J. Buescher**, secretary-treasurer (with Bendix Foote since 1928).

What They're Doing

GILL STARTS A NEW CAMPAIGN—Gill Robb Wilson, Herald Tribune aviation writer and former aviation director for New Jersey, strikes a confident pose between speeches while stumping as a Republican representing the 4th New Jersey District. A veteran campaigner, Wilson during World War I was a member of French Escadrille 66 and U. S. Squadron 163.

Changes

K. N. Bush has been named production manager of General Electric's Large Apparatus division, succeeding **L. E. Gaughan**, recently appointed chairman of the Apparatus department's mobilization planning committee. . . . **George Keller** has joined Air Carrier Engine Service, Inc., Miami, as sales and service manager. . . . **E. V. Crane** has returned to the engineering department of F. W. Bliss Co. in Canton, Ohio. . . . **J. B. (Jerry) Clark** has been named technical representative for Bell Aircraft Corp. and will be in charge of the company's office in Washington, D. C.

Honors and Elections

▶ **Board Elections**—Dr. Ross A. McFarland, Admiral Edward H. Smith and Charles A. Rheinstrom have been named to Flight Safety Foundation's board of governors.

INDUSTRY OBSERVER

(This week's column is compiled from observations of an AVIATION WEEK *editor at Dayton, Ohio.)*

▶ **Entanglement of a Nylon tow rope in the main rotor blades of a Sikorsky H-5 helicopter is believed to have caused the crash of the helicopter at Wright Field, resulting in the death of the pilot. Tow plane, a C-47, was not damaged. Normal towing procedure is for both aircraft to take off with power, and for the rotary-wing craft to cut its power after it reaches cruising altitude, relying on the forward motion of the tow to keep its rotor in auto-rotation. Crash happened shortly after takeoff, when the helicopter lost its rotor at about 1000 ft. altitude. Examination indicated the tow rope snapped about 28 ft. from the helicopter, and wound around the rotor. The machine had previously completed its towing tests satisfactorily and at the time of the accident, was being demonstrated for some visiting pilots. The helicopter towing program at Wright Field, which seeks to extend range of rescue helicopters, is expected to be continued in spite of the accident.**

▶ Small manufacturers who want military aviation contracts will fare better by subletting subcontracts from larger companies, than by going direct to the Air Force for prime contracts at the present stage of Air Force procurement, Dayton observers say. Definite instructions have gone out to the prime contractors that they must use up all available tooling and plant space by subcontracting before the Air Force will even consider expanding their prime facilities. Air Force is also supplying subcontractor lists to prime contractors from its lists of approved facilities, in some cases calling the bluff of prime contractors who say no subcontractors are available.

▶ **Unless the overall Air Force procurement program takes another big jump, beyond its maximum 1951 level now contemplated in congressional legislation, there is little chance that reserve plants will be opened. A "hold-the-line" policy to avoid plant expansion until all present facilities are "saturated" is expected to result in accommodating virtually all the present program in plants now in operation.**

▶ Ratio of negotiated Air Force contracts to advertised contracts, which in fiscal 1949 was about two to one numerically, and about 15 to 1 in dollar value, is expected to be even more lopsided under the expanded new procurement program, manufacturers' representatives at Dayton say.

▶ **Experiments with unconventional airframe materials are continuing at Wright Field Materials Laboratory. Northrop Aircraft Inc. has been awarded a development contract to produce an airplane wing of magnesium by casting, and to test it against a similar wing made of aluminum sheet and extrusions by conventional manufacturing process. Northrop's previous experience with magnesium airframe manufacture included building the XP-56, an all-magnesium plane, made of sheet welded by Heliarc welding, and a center-wing section of cast magnesium, made for a missile.**

▶ Canadian aircraft manufacturers are expected to get additional U. S. Air Force contracts, with Canadair Ltd. the most likely prospect, reaping further benefits from its Douglas parts business.

▶ **Despite the fact that Sikorsky didn't win the recent Air Force rescue helicopter competition, recent H-19 orders have put the big new Sikorsky machine farther along toward volume production than any of its competitors.**

▶ Air Force has assigned helicopter designations H-22 and H-23 respectively for the Kaman and Hiller machines which it has purchased for evaluation purposes.

AVIATION WEEK

VOL. 53, NO. 10

SEPTEMBER 4, 1950

What 1951 Military Aviation Budget Will Buy

	Air Force	Navy Air	Foreign Aid	Total
Total fund allocation	$10 billion	$3.4 billion	$1.148 billion	$14.548 billion
Procurement of planes	$4.1 billion	$2.3 billion	$1.148 billion	$7.5 billion
Number of planes procured	4428	3357	Not available	7785
Active inventory of planes maintained	11,000	7335	Not available	18,335

Buying Plans: 7785 Planes, $6.4 Billion

USAF and Navy soon to get triple last year's sum, and another boost may come.

Funds for a $6.4-billion plane purchasing program for Air Force and Navy in 1951—more than triple the $2.2-billion program of the 1950 fiscal year—pped through Congress last week.

Meanwhile, still another major boost in the 1951 fiscal year defense budget proposal, which now stands at approximately $30 billion, is predicted.

▶ **Additional Funds**—Rep. George Mahon, chairman of the House Appropriations Subcommittee on the Armed Services, reported that the Department of Defense "is now preparing additional estimates of funds needed" which "will fall within the range of $10 billion." This came on the heels of Sen. Harry Byrd's statement that the "top command" had informed him that $17 billion additional will be required for U.S. armed services and foreign military aid.

Added to the $6.4-billion Air Force-Navy program, are funds for a $1.1-billion foreign aid program which also is moving forward in Congress, boosting the total planned plane procurement to $7.5 billion. (NOTE: this is one-60th billion less than the $7.7-billion AVIATION WEEK estimate of Aug. 7.)

The defense budget picture on Capitol Hill last week looked like this:

• **Congressional action** was completed on the regular 1951 fiscal year defense budget carrying $2.5 billion for aircraft procurement: $1.7 billion by the Air Force, $733 million by the Navy, and $224 million under the foreign arms aid program.

• **The House Appropriations Committee** approved a $15.6-billion defense supplemental bill allowing $5 billion for plane purchases, including $2.6 billion by USAF, $1.6 billion by the Navy and $924 million for foreign aid.

▶ **Total Budgets**—If Congress, as is expected, okays the supplemental measure, total budgets for this year will be:

• **Air Force**: $10 billion (including $810 million in contract authorization). This compares with $6.1 billion (including $1.9 billion in contract authorization), at which $735 million was impounded for the 1950 fiscal year.

• **Naval aviation**: $3.4 billion (including $375 million in contract authorization).

• **Aircraft for foreign countries**: $1148 million. USAF will purchase, or supply out of stock, $1116 million of the planes and the Navy will supply $32 million worth. In the 1950 fiscal year, plane purchases for overseas shipment under mutual defense agreements totaled only $51 million.

▶ **7700 New Planes**—The defense program as now blueprinted, designed to offset losses in Korea and "build up the posture" of the air arms, provides for the procurement of 7785 aircraft: 4428 for USAF and 3357 by the Navy. (The Navy says this still falls 457 planes short of meeting its "minimum" requirements.) USAF procured 6250 and the Navy 7798 planes in the 1950 fiscal year. Air Force would expand to a 59-group program, instead of leveling off at 48 groups of planes as originally planned.

The program still will not build the full peacetime force of 73,000 operating aircraft—20,500 for USAF and 14,500 for the Navy—urged by the Congressional Air Policy Board in 1948. Instead, it will provide for an "active inventory" of 11,000 USAF planes and 7335 operating Naval aircraft.

▶ **Bradley Warning**—Gen. Omar Bradley, chairman of the Joint Chiefs of Staff, cautioned, "we may have to come back and ask for more."

Should the program be maintained at the level now asked (defense chiefs say it will if the Korean war is won in the next few months and there are no other outbreaks), aircraft procurement for the next half-decade is charted as follows:

• **1951 fiscal year**, $6.4 billion ($4.1 billion for USAF, $2.3 billion for the Navy).

• **1952 fiscal year**, $4.7 billion ($2.4 billion for USAF, $1.8 billion for the Navy).

• **1953 fiscal year**, $2.7 billion ($1.2 billion for USAF, $1.5 for the Navy).

• **1954 fiscal year**, $3.5 billion ($2 billion for USAF, $1.5 billion for the Navy).

• **Level-off**, $4.3 billion ($2.8 billion for USAF, $1.5 billion for the Navy).

▶ **Too Small**—But this program is already written off as too small in informal Washington circles.

The outlook is that even if the Korean war were settled by the end of the year, which is unlikely, defenses at home and abroad will have to be stepped up further over the program now projected.

Funds in the regular 1951 fiscal year appropriation measure and the $15.6-billion supplemental provide for the following:

• **Research and development, USAF**: $205 million, plus an undetermined additional allocation, part of a $120 million provision for the three services in the supplemental measure, earmarked for distribution by the Secretary of Defense.

• **Research and development, Navy**: $102 million—$75 million in the regular supply bill and $27.5 million in the supplemental.

• **Industrial mobilization, USAF**: $14 million, plus an allocation from $70 million in the supplemental.

• **Industrial mobilization, Navy**: $13 million—$4 million in the regular bill and $9 million in the supplemental.

▶ **Arnold Center**—Funds are also provided for completion this year of the

$100-million development at the Arnold Engineering Development Center in Tennessee and the $160-million radar fence; $6 million is allocated for development at the $75-million Long-Range Guided Missile Proving Ground, Cocoa, Fla. $5 million was appropriated by Congress toward the project last year.

AFA Conclave

Finletter cites value of strategic air power, backs AF switch to jets.

Boston, Mass.—Thomas K. Finletter, in his first public address since taking office as Secretary of Air Force, upheld continued reliance of this nation's defense upon a strategic air force and defended USAF's conversion to an all-jet air force for offense.

Speaking before the Air Force Assn. fourth annual convention last week in Boston, Finletter deplored reports that USAF's Lockheed F-80 was too fast to hit targets as well as the slower North American F-51.

"The first task of an air force," Finletter declared, "is to get air superiority and this can be done only by having airplanes which are fast enough and have firepower enough to drive the enemy from the skies. In tactical warfare, only the modern jets can achieve this air superiority" (AVIATION WEEK Aug. 7).

Slower piston-engine planes used in World War II would not last long against a force of fast jets, he said.

"I do not mean to suggest that there must not be specialization in the types of planes with which the Air Force will be equipped—especially in the tactical field," Finletter continued. "There is a role for slower planes for certain purposes, he said, and this role will be exploited as the Air Force grows.

▶ **Basic Strategy**—Speaking of the Strategic Air Force, he said, "We must not be misled by the specialized events of the Korean aggression into wrong ideas as to the nature of the defense establishment we need to carry out our basic strategy.

Strategic defense of this nation is three-fold:

• **Interceptor Net.** The U. S. must have a strong force in-being capable of defending this nation against strategic air attack by the enemy.

To do this the United States must place heavier emphasis on Radar techniques and installations, intercepting aircraft forces, and specialized missiles to blunt the attack of the enemy's guiding forces.

• **Strategic Air Atm.** We must have in being a force of unmistakable power

VENDOR'S RECEPTION: Miss Burt Wall offers advice on whom to see.

What Every Supplier Must Do

Dayton—Watch them. Dozens, hundreds of them, bewildered small business men, groping, at Wright Field, for contracts not yet made.

Many of them don't know what they want to make or what service they want to perform.

But they want to do something for the Air Force, prefer to see their share in uniform actions, and want to keep their business going.

Last week in one day, five receptionists in the Contractor Relations Office made appointments for 287 business men.

Contrast this with a normal pre-Korean-crisis day in the same office. Then three receptionists used to make about 80 appointments a day.

▶ **"Follow Me"**—Byron Dempsey, Small Business Liaison Officer for Air Materiel Command, wrote a book a year ago, a yellow-backed pamphlet with a "Follow Me" jeep on the cover, called: "A Guide for Selling to the United States Air Force."

When it was first printed and sent around, there was a big demand for it, at the rate of about 100 copies a week. Later the demand dropped off to about five copies a week.

But a couple of weeks ago, his office mailed 1800 copies in a week.

Reports coming in to Wright Field, the Air Force buying centre, from the procurement field offices tell the same story.

Right now the Air Force can do two things, and that is about all:

• **List the company's name, facilities and availability in the big enrollment of more than 15,000 firms which are qualified Air Force sources.**

• **Supply these names to its prime contractors as possible subcontractors.**

▶ **Letter Perfect**—But the small business man doesn't have to come to Wright Field, or even to his nearest procurement field office, to get such a listing. He can do it simply by writing to: Air Materiel Command headquarters, Wright-Patterson AFB, Dayton, Ohio. Attention: MCP PN872 and ask for an index of USAF Catalogs of Items.

At the present time, meanwhile, the small business man can use the money he would spend on a trip to Wright Field much more wisely in most cases. He can spend it ringing doorbells at the plants of the principal big Air Force contractors in his own immediate region and make his availability as a subcontractor known.

And whether he is a small business man or a larger manufacturer, if he is a newcomer he will do well to explore the possibilities of the subcontracting picture very thoroughly at this early stage, before the major prime contractors make their commitments.

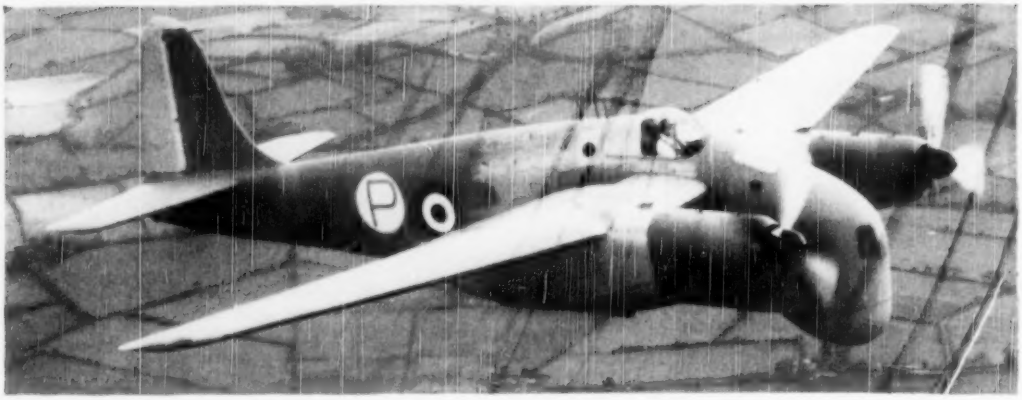
Frankly speaking, his chances, as a newcomer, of getting a prime contract against experienced competitive bidding or a negotiated contract procedure are not too bright, even when 1951 funds are made available by Congress. He may stand a better chance after he has shown his ability to fulfill subcontracts.

—**Alexander McSurely**

which will destroy the enemy's capacity to fight.

To do this the United States must spare no effort to see to it that this strategic air force constitutes a defensive counter measure of such violence that it will make it clear to anyone that to attack us would be suicidal.

• **North Atlantic Treaty.** The final task of U. S. strategy is to maintain the lines of sea communication as free as possible from enemy attack. The defense of this free world, Finletter said, centering as it does in large measure around the North Atlantic Treaty arrangements, is indispensable if the kind of society we believe is right is to survive.



SHORT S. B. 3's "droop snoot" houses anti-sub stalker's radar operator and his equipment. S. B. 3 is designed to operate from carriers.

SBAC Show Stars Turbine Craft

Military designs will predominate at the Farnborough display, with over half powered by turbine engines.

By Frederick R. Brewster
(*McGraw-Hill World News*)

London—Britain continues to spawn new turbine aircraft in production and again this year that point will be emphasized at the annual flying display and exhibition of the Society of British Aircraft Constructors Ltd. at Farnborough, Hampshire, Sept. 7-10.

Over half of the approximately 60 aircraft to be shown will be powered by turbine engines. Of these, at least 19 will be new types that have been developed and flown since the 1949 SBAC display. Besides these new turbine-powered types, there will be eight or more new piston-engine aircraft.

Some of the turbine powered jobs, it is true, have already been announced and shown off to a limited audience, but this will be their first public showing. The others, however, are still on the secret list and some of them have not yet flown as of this writing. They are being frantically rushed to completion in the hope of "making" the annual show, which is such a big selling place for British aircraft to the world's buyers.

▶ **Mostly Military**—Of the new turbine aircraft, military types predominate and only one really new civil airliner is to be represented. These new planes are now firmly committed to appear:

• **Armstrong Whitworth Meteor** night fighter, NF 11, powered by two Rolls-Royce Derwent 5 turbojets. This version of the Meteor flew for the first time on May 31, but was ordered into quantity production for the RAF many months ago.

• **Hawker P.1081** sweptwing jet fighter, with a Rolls-Royce Nene turbojet, which made its first appearance in public at London Airport on June 23, four days after its first flight, and was later demonstrated at the International Air Display at Antwerp. This Hawker, a further development of the P.1052 which made spectators gasp last year at Farnborough with its breath-taking speed and maneuverability, has been picked by the Australians for production "Down Under." (AVIATION WEEK Aug. 28).

• **Short S. B. 3** twin turboprop carrier-based anti-sub plane. Descended directly from Short's twin Merlin-powered Sturgeon, the S. B. 3 is already in quantity production for the Royal Navy. It is powered by two Armstrong Siddeley Mamba turboprop engines.

The standard jet fighters now in production for the RAF—the Meteor 8 and the Vampire—will be shown again, of course, plus the Sea Hawk and Attacker naval fighters. The de Havilland stable will be represented by its Vampire 5 and D.H.113 night fighter types, both popular with overseas customers but not now in production for home consumption.

The first public demonstration of in-flight refueling of a jet fighter will be carried out over Farnborough during the flying display. The aircraft will probably be a Meteor, refueled from a Lincoln, with the operation carried out as low over the field as weather permits.

▶ **Only One Jet Bomber**—The year has failed as yet to produce any more jet bombers for the RAF, so the English Electric Canberra light-medium bomber will have this field all to itself. This year, the Mk 2 Canberra, with a third seat added, will be shown. English Electric is already in quantity production on this aircraft for Bomber Command.

The shape of things to come may be suggested by the second Avro 707, a delta-wing single-jet research job which, it is widely suggested, is a fine runner of a still to be disclosed four-jet bomber by A. V. Roe & Co. Ltd. The first 707 appeared at last year's show, but crashed in a test flight soon afterwards.

▶ **New Naval Category**—For anti-submarine reconnaissance, the Navy now has its choice of three prototypes, two of them powered by the Armstrong-Siddeley Double Mamba turboprop engine.

These are the Fairey 17, which has been flying since last fall, and the Blackburn & General Aircraft Y.B.1, which flew for the first time on July 19. Both of these were produced to meet the same set of Navy requirements for carrier-based aircraft. Blackburn, in addition, produced a piston-engine craft,

the Y.A.5, with a Griffon engine, which has been flying over 150 hours and has been the basis of its turboprop version. From the competitive testing of these three types, one will emerge with the Navy's contract. All three will be shown off at Farnborough.

The jet-turboprop-powered Westland Wyvern 2 attack plane for carrier-based operations, will also be there.

▶ **Meteor Variants**—Not yet definitely promised, but likely to appear, are Gloster's two new photo-reconnaissance versions of its Meteor design, the F.R.9 and P.R.11, which have flown recently.

Another Meteor variant to be shown is one with the Derwent turbojets replaced by Avons—these will probably be the most powerful R.A.5 series.

The Armstrong Siddeley Sapphire engines installed in the outboard nacelles of a venerable Lancastrian, will also be demonstrated in flight.

The Bristol Proteus, new 3200-hp. turboprop, will be shown and flown for the first time, fitted in the outboard nacelles of an A. V. Roe Lancaster bomber.

▶ **Civil Airliners**—Among the new faces in the commercial transport category will be the Vickers Armstrongs Viscount 700—the production version of the design, with a longer fuselage than the prototype. Vickers is now looking up for series production of Viscounts, of which BEA has ordered 28. The 700 has not yet flown, but it is confidently expected that it will be ready in time for the show.

Bristol's giant Brabazon, largest airliner in the world, will be on view at the show. It will take off and land during the afternoon display each day. The Brabazon will be landing away from its home airport of Filton for the second time. In June, at London Airport, it landed in 1200 yd. and took off in 1400 yd.

Two research aircraft underwritten by the Ministry of Supply will be shown at Farnborough. They are both being used for exploring the problems of jet transport operation and instrumentation at high altitudes. They are:

• **Tay-Viscount,** with the four turboprops of the second Viscount prototype replaced by two Rolls-Royce Tay turbojets.

• **A. V. Roe Ashton,** a further development of the Tudor 8. Like its predecessor, it will have four Nenes paired in two nacelles slung under the wing, but it has been modified to have a tricycle undercarriage. The Ashton is said to be markedly different from the Tudor 8 in its tail and fin assembly. The new, large, square-cut rudder (against the rounded, and apparently too small Tudor fin) should help give directional stability lacking in the Tudor.

Six of these Ashtons have been ordered by the Ministry—presumably salvaging some of its already huge investment in Tudor aircraft by using up some of the stock of Tudor components. It may be significant that the Ministry continues to stimulate jet transport research in Britain, despite the existence of the privately developed de Havilland Comet.

The Comet will be put through its paces again, of course. But the Avro Canada Jetliner will not appear at Farnborough this year, because of too many commitments for demonstration flights in North America. Likewise, the Avro Canada CF-100 (twin-jet fighter) has been withdrawn. Thus what was to have been a slightly international flavor to this year's show has been regrettably given up.

No new helicopter airliners have been forthcoming this year, but the Hiller-5 and the second prototype of the Apollo, with its large diesel fin, will be shown. Armstrong Whitworth has decided against building the large-capacity Apollo, but one or two South American countries have shown some interest in the 24-35 passenger version.

▶ **Few New Piston Types**—Progress in the piston engine categories will be less widely marked, but the huge Universal Cargo Transport, built by Blackburn & General Aircraft, will head the "new" list.

The de Havilland Heron feederliner, the Handley Page and Percival home-trainer prototypes, and several new Auster light planes (the Aiglet, the Arrow, the Autocrat, and the Autocar, for civil flying, and the Auster 7 for Army reconnaissance and liaison work) plus the new Prestwick Pioneer 2 with an Alvis Leonides engine complete the list of new piston aircraft.

Familiar to regular SBAC attenders and rounding out the range of types available from British manufacturers will be the third Ambassador (whose furnishings are similar to the 20 planes ordered by BEA), the Ballid 2 advanced trainer, and its competitor in the design race, the Athena 2, the Bristol Freighter, in two versions (military, MT 31, commercial, CS 31), the de Havilland Dove feederliner and Chipmunk basic trainer, the Firefly 5 naval fighter, the Marathon 1, in production for BEA, the Power feederliner, and a survey model of the same aircraft, the Shackleton ocean-reconnaissance plane for Coastal Command, and the Varsity bomber-crew trainer plus a classroom version of Vickers' Valetta.

In the helicopter group, Bristol's 171 Mk 3, the production version, which is being built to the order of a number of customers including BEA and the Ministry of Supply, who'll each take one or two for helicopter research, and the Westland Sikorsky S-51, will again be on show.

Cierva, disheartened by the crash of the second Air Horse a few months ago, has withdrawn entirely from this year's SBAC show.

The giant Brabazon will again fly over the field as part of the exhibit.

Equipment suppliers will again display their wares in a comprehensive static display in the hangars close by the airfield.

Trainer Tests

Entries from Britain and Canada to compete with U.S. planes at Randolph.

International competition, now in prospect for next year, will be the real test for military trainer planes scheduled by Air Force and Navy at Randolph AFB, Tex., Sept. 29.

In addition to the three new American trainers previously announced as competitors, Canada and Great Britain each will submit a trainer type. This is a step beyond standardization of pilot training procedures for the three nations, using trainers with similar flight characteristics.

The Canadian government will provide two de Havilland Chipmunk DHC-1 trainers, while Great Britain will provide two Boulton Paul Ballid 1 Mark II trainers. These will be evaluated in school training against the Fairchild T-31, the Beechcraft T-34, the Temco T-35 and against data already compiled on the North American T-6, now standard trainer for Air Force and Navy. All are low-wing, all metal two place craft.

Department of Defense stated that it is not expected that any of the competing nominations will win a production contract for the trainers presently in competition. The evaluation, however, is expected to develop "ideal" specifications for the standard primary basic trainer, which will be made available to all three governments for improvement and greater standardization of future trainer production orders.

▶ **Tandem**—The Canadian entry is a tandem with 140-hp. Cygnet Major I-C engine, and is the only plane entered with fixed conventional landing gear and fixed-pitch propeller. Designed these features the following performance is quoted. Top speed, 140 mph.; rate of climb, 900 fpm.; service ceiling, 17,200 ft.; range 485 miles. Dimensions are span, 34 ft. 4 in.; length, 25 ft. 7 in.; and height, 7 ft. Normal takeoff weight is 1930 lbs.

The British entry is the most powerful and highest performance plane in the competition, comparing most closely in these respects to the new North American T-28 trainer, which is not entered in the evaluation.

The Boulton Paul craft is powered

AIA's Dues List for First-Half 1950

Allison division of General Motors Corp. made the biggest dues payment—$41,707—to Aircraft Industries Assn. during the first six months of this year. But Allison is not AIA's biggest dues payer. Members pay dues at different times, each according to his fiscal year, so the present six-months dues total is not actually one-half of the levy for the year.

Stipulating that "no substantial part" of its activities consists of attempting to influence legislation, AIA in a report filed under the 1946 Lobby Registration Act, showed dues collections from 36 members of $270,281 during the first half of the year and a net expenditure of $165,592, of which it estimated only $3782 was in connection with legislative activities.

In order of the amount paid, AIA lists dues from its membership for the six months ending June 30, as:

- Allison division, General Motors Corp., $41,707
- United Aircraft Corp., $23,960
- Boeing Airplane Co., $23,960
- Curtiss-Wright Corp., $21,590
- Douglas Aircraft Co., $21,508
- Consolidated Vultee Aircraft Corp., $19,870
- North American Aviation, Inc., $19,569
- Bendix Aviation Corp., $13,340
- Lycoming Engine & Airplane Corp., $11,021
- Glenn L. Martin Co., $10,4[illegible]
- Republic Aviation Corp., $9,251
- Thompson Products, Inc., $7900
- Aviation Gas Turbine division, Westinghouse Electric Corp., $6577
- Northrop Aircraft, Inc., $5661
- McDonnell Aircraft Corp., $5757
- Aeroproducts division, General Motors Corp., $5531
- Beech Aircraft Corp., $5355
- AiResearch Manufacturing Co., $2791
- Cleveland Pneumatic Tool Co., $2561
- Hughes Aircraft Co., $2413
- Sperry Gyroscope Co., $2399
- Ryan Aeronautical Co., $2035
- Cessna Aircraft Co., $1269
- Bell Aircraft Corp., $1155
- Minneapolis-Honeywell Regulator Co., $900
- General Tire & Rubber Co., $861
- Continental Motors Corp., $858
- Pioneer Parachute Co., $843
- Kollsman Instrument division, The Square D Co., $773
- Hydraulic division Sundstrand Machine Tool Co., $751
- Piper Aircraft Corp., $707
- Reynolds Metals Co., $700
- B. G. Corp., $699
- Radioplane Co., $693
- Piasecki Helicopter Corp., $640
- Avco Manufacturing Corp., $553

by a Rolls-Royce 53 liquid-cooled 12-cylinder V-type engine rated at 1250 hp. for takeoff. Its two seats are side by side and outer wing panels can be folded upward. Landing gear retraction, flaps and brakes are pneumatically actuated. Equipment includes a constant speed four-blade propeller. Performance quoted is: top speed, 395 mph.; cruising speed, 240 mph.; service ceiling, 22,400 ft. Dimensions are: span, 39 ft. 4 in.; length, 32 ft. 11 in.; and height, 12 ft. 6 in. Normal take-off weight is 5410 lb.

Comparable data for the three new American planes were reported in AVIATION WEEK Aug. 28 issue.

The training evaluation calls for the Air Force and Navy to train approximately five aviation cadet in each of the planes being evaluated, with the Air Force slated to begin the training in mid-1951 at Randolph Field, to be followed by similar Navy training at Pensacola. NAS

Mustered Out

Airlines to get Pacific airlift planes returned beginning this month.

Some of the six commercial airline planes hostily put in Air Pacific service under military contract beginning outbreak of the Korean war are scheduled for return to civilian operation this month (AVIATION WEEK Aug. 28).

Maj. Gen. Laurence S. Kuter, commander of the Military Air Transport Service, has announced that by Sept. 22 MATS will be able to meet an increasing proportion of its requirements with military aircraft. Other military sources indicated that all the airline planes should be out of the emergency airlift by next January.

▶ **Carriers Probed**—Kuter commended the airlines for responding instantly and wholeheartedly to the military call for equipment. He said both civilian and moonlighting carriers had done a "magnificent job" although "we may feel that we are in fact a free-for-all operation and an increase of the armed forces."

In reference to commercial airline MATS set up connections for the employment of the individual carriers on leading hub routes and for each Pacific government airlift operation. It is expected that the airlines and for the military are proving profitable.

▶ **Equipment Listed**—Equipment now under contract to the military includes: Pan American 2 Stratocruisers, 8 DC-4s; American 7 DC-4s; Northwest Orient 3 Stratocruisers, Capital 2 DC-4s, Eastern 4 DC-4s, Northeast 1 DC-4s, National 1 DC-4, TWA 4 DC-4s, Delta 1 DC-4, Braniff 1 DC-4, United 6 DC-4s, Seaboard & World 4 DC-4s, Flying Tiger Line 8 DC-4s, Transocean 2 DC-4s, Orient 2 National 2 DC-4s, Alaska Airlines 1 DC-4, and Colonial Eastern 1 DC-4.

In addition, a C-54 assigned by Sabena, Belgian airline, to the United Nations has been in the Pacific airlift since Aug. 10. Canadian Pacific furnished three DC-4Ms on Aug. 14.

▶ **Military Planes Switched**—Kuter disclosed that when the Korean war broke out MATS had less than 60 of its 200 C-74s assigned to the Pacific Division. It was able to increase this Pacific strength to 100 by transfers from other theaters. But these extra 40 transports represented the maximum diversion MATS could make without seriously affecting the support of U. S. Armed Forces in other parts of the world.

U. S. Air Force C-54s redeployed from Troop Carrier groups with a total of about 78 C-54s to speed MATS in the Pacific airlift. One of these groups was redeployed from Germany. The Continental government lent six DC-4M RC-4F North Stars for the emergency.

Thus, the airlift fleet is greatly above 250 planes supplemented by MATS C-74s and C-97s assigned to Japan, U. S. Alaska and Hawaii.

▶ **Lift Increases**—In May, Japan was receiving about 70 tons of supplies and movement per month by air. During its only flight period in the airlift 57,000 passengers and over 1300 tons of other cargo, a total of 5200 tons were moved to the Far East by plane. Current lift averages about 100 tons a day.

High priority cargo consisted of blood, chemicals, medical supplies, rockets, 30 million ammunition, tank parts, machine gun mounts, radio batteries, machine parts and aircraft parts. Air movement of critical material was additionally facilitated by dispensing with the heavy crating, packaging and waterproofing required by surface movement.

PRODUCTION

Navy Connies

Orders for R7O version help boost Lockheed's backlog to $431 million.

Lockheed Aircraft stockholders last week had good reason to be pleased with their company. Reason: President Robert E. Gross told them that Lockheed's backlog has recently skyrocketed to a fat $431 million—nearly twice the unfilled orders the company has had on its books at any time since the end of World War II.

It looked like the "evergreen" Constellation would keep going forever. Lockheed has orders for 43 commercial Connies and several Navy versions designated PO-2W.

In a new move, Navy put in its bid for more to haul cargo. The cargo types, designated R-70-1, will be military versions of the elongated commercial Model 1049 Super Constellation ordered by Eastern Air Lines (AVIATION WEEK, May 1, p. 11). Seating 92, the EAL models will weigh about 116,000 lb. gross and have the Wright R-3350-C18CA1s developing a total of 11,000 hp.—1000 more horsepower than EAL's present Connies. Cruising speed is to be 330 mph., aided by installation of jet exhaust sticks.

In addition, the company is busy turning out the F-94 all-weather fighter, T-33 jet trainers, and P2V Neptunes. Net result is that the company can count on keeping its plant busy until 1952 or even 1953.

▶ **Earnings and Deliveries**—First six months of the year found the company with total sales of $84,479,000, way up over the $55,785,000 for the same period in 1949. Commercial sales for the period were up almost one-third over sales for all of 1949. Up to June 1950, Lockheed had delivered 60 percent more planes (346) than for the same period last year.

The company's labor force, growing since June '50, totaled 17,007, including that of wholly owned subsidiaries. Gross thinks that it will become necessary in the future to begin worker training programs. Since the trouble in Korea, Lockheed has limited its employment program to experienced engineers and aircraft mechanics.

Aircraft Shipments

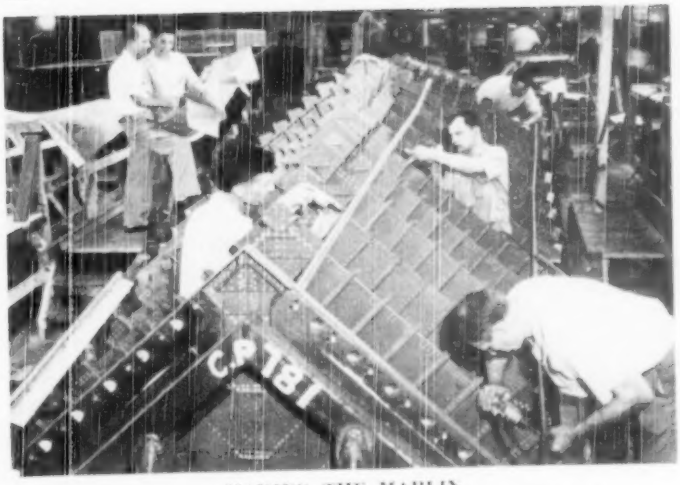
Aircraft shipments, measured in airframe weight, amounted to 3,686,000 lb., with 85 percent of that total going to U.S. military customers, during June.

The Commerce Dept. reports also that U.S. military customers had received shipment of 16,712,200 lb. of airframe weight during the first six months of 1950. This represents an increase of more than 3 million lb. over the same period during 1949, when 13,078,400 lb. were shipped to military customers.

June shipments of civil aircraft amounted to 309 planes valued at $9.4 million. May shipments totaled 377 planes with a dollar value of $7.5 million.

Total horsepower of aircraft engines shipped during June amounted to 4,828,200, with military customers accounting for 96 percent. During the first six months of the year, shipments to U.S. military customers totaled 23,993,500 hp., compared to 19,707,600 hp. for the same period of 1949.

Employment during June was 166,273 in airframe plants, only slightly higher than the May figure of 165,273. Employment in aircraft engine plants showed a similar slight increase in June.



MAKING THE MARLIN

Hull section of a Martin PSM-1 Marlin patrol boat nears completion on the company's production line at Baltimore. The company is using World War II experience gained on the Mariner for turning out the big Navy boats in large sub-assemblies, then placing them in fixtures for final assembly by riveting. The long-range Marlin recently was awarded a "substantial" new production order.

C-W Closing Down Airplane Division

As the aircraft industry in general had plans for expansion, Curtiss-Wright Corp. last week announced it was closing its Columbus, Ohio, airframe plant when present contracts are fulfilled.

When Curtiss finally moves out of the portion of the plant it has leased from the Navy, along about next March, the Airplane division will cease to exist—ending one of aviation's oldest airplane construction organizations. The present Curtiss-Wright Corp. resulted from a merger in 1929 of Wright Aeronautical Corp. and Curtiss Aeroplane & Motor Corp., founded by Glenn H. Curtiss before World War I.

Cause of the closing of the Columbus plant, which C-W shared with Luftton Corp., is simple: no business. For the past several years, the Airplane division has been doing subcontracting and overhaul. It has had no prime airframe contract since the end of the war, when it moved from Buffalo to Columbus. The division at present has about 1200 employees. Their union and the management had been unable to agree on a new contract, and a strike notice had been served. But C-W emphasizes that the decision to close Columbus had been under discussion for many months and is not related to the impending strike.

Future of the Airplane division employees and executives has not been decided.

Warner Coming Back

Warner Aircraft Co. is coming back strongly into the aviation field with a fresh design and management team setting up the new plays.

Owner of the property, Clinton Machine Co., Detroit, which had taken

Wanner over last spring, had tabbed the acquisition a bad deal and was contemplating liquidating the property. But the recent boom in the aircraft industry resulted in a reappraisal of Wanner's hydraulic products, and management's decision was to send the division back into the field.

New general manager of the Wanner division is smilin' Jack P. Pedersen, formerly with Powell Crosley, Jr., and Scintilla Magneto division of Bendix Aviation Corp.

New assistant to President Don Thomas is Col. Oliver K. Gardner, who will handle Wanner liaison with government and manufacturing purchasing offices. Gardner's most recent position was as civilian chief at USAF supply at Wright Field. New chief engineer is Clarence A. Sherman, previously in charge of development and designing of aircraft hydraulic valves and systems for Vickers, Inc.

PRODUCTION BRIEFING

▶ **Lockheed Aircraft** is trying out a new point of curtailed inspection. Since July 1, all routine Air Force spot inspections have been discontinued and actual physical inspections are made by company employes only. Major purpose is to minimize production delays.

▶ **Cessna Aircraft Co.**, Wichita, announced it has received orders for major assemblies of the Boeing B-47 Stratojet bomber. Units will be delivered to Boeing's Wichita plant for final assembly.

▶ **Ardec, Inc.**, is a new Media, Pa., firm which will specialize in precision parts and assemblies on a production basis for aviation and other fields. Special engineering and research problems, including prototypes and testing units, will be handled.

▶ **Gould National Batteries, Inc.**, is the new name of the National Battery Co. National entered the industrial field with the purchase of the Gould Storage Battery Co. and later the battery business of Philco Corp.

▶ **Transport Equipment Co.**, Burbank, has moved into larger quarters to take care of expanded business. The new plant permits tripling of the former production capacity.

▶ **Shakeproof, Inc.**, division of Illinois Tool Works, Chicago, is now marketing Lin-Lok, Longitype self-locking nuts under the new trade name Lokuts. The fastener is manufactured under license from Boots Aircraft Nut Corp.

▶ **Aeroquip Corp.**, Jackson, Mich., is undertaking a $500,000 expansion program and is adding 55,000 sq. ft. of plant area for manufacturing purposes. Backlog is over $2 million, double last year's.

▶ **Transport Equipment Co.**, Burbank, Calif., has moved into new quarters with triple the company's former production facilities.

AF Invitations

Bids openings are 20-30 days after approximate issue dates shown in the following bid proposals. Bid sets containing specifications for items to be procured will be sent to qualified applicants who state bid invitation number.

One bid set will be available for examination without charge by prospective bidders, after bid publication date, at each of the seven AMC procurement field offices. This will enable firms to see specifications before writing or telegraphing for their own bid sets.

Procurements bid after issuance: Boston Army Base, Boston 10, Mass.; Government Aircraft Plant No. 4, Ft. Worth 1, Tex.; 39 S. LaSalle St., Chicago 3; Wright-Patterson AFB, Dayton, Ohio; West Warren and Lunge Aves., Detroit 32, 137 W. Washington Blvd., Los Angeles 67; Broad St., N.Y. 4.

INVITATIONS

Hardware, class 79, 1-24 items, bid invitation No. 51-141, issue date 11 Aug., delivery schedule shall be set forth in the call letters when issued.

Cabinet, instrument testing, 2 each, bid invitation No. 51-139, issue date 17 Aug., delivery within 60 days.

Rivets, 1-42 items, bid invitation No. 51-145, issue date 11 Aug., delivery schedule shall be set forth in the call letters when issued.

Aircraft hardware, 1-27 items, bid invitation No. 51-135, issue date 17 Aug., delivery within 120 days.

Gages, 1-7 items, bid invitation No. 51-121, issue date 17 Aug., delivery starting in May 1951.

Indicators, 1-4 items, bid invitation No. 51-143, issue date 11 Aug., delivery starting in March 1951.

Aircraft instruments, class 05D, 1-6 items, bid invitation No. 51-146, issue date 14 Aug., delivery starting in Feb. 1951.

Control panel, 1-5 items, bid invitation No. 51-128, issue date 17 Aug., delivery complete within 120 days.

Anodes, silver, sheet form, 25,000-100,000, bid invitation No. 51-119, opening date 4 Sept., delivery schedule shall be set forth in the call letters when issued.

Aluminum metals, class 23-A, 1-60 items, bid invitation No. 51-63, opening date 31 Aug., delivery schedule shall be set forth in the call letters when issued.

Filing sections, 1-6 items, bid invitation No. 51-111, issue date 28 Aug., delivery [illegible] within 45 days, complete within 75 days.

Case remover producer, 100 each, bid invitation No. 51-138, issue date 24 Aug., delivery of 50 within 60 days, production to start 60 days after approval of bid article at not less than 100 units per month thereafter.

Link-pawl, long bomb shackle, 121,[illegible] each, bid invitation No. 51-[illegible], issue date 11 Aug., delivery starting within 60 days.

Case, cards and holder flight range guide, [illegible] each, bid invitation No. 51-[illegible], delivery [illegible] per month beginning November, issue date 28 Aug.

Chair-dining hall and table-dining hall, 1-2 items, bid invitation No. 51-[illegible], issue date 24 Aug., delivery 25% within 45 days, complete within 90 days.

Commercial brass, 1-24 items, bid invitation No. 51-199, issue date 24 Aug., delivery starting within 30 days.

Washers, 1-17 items, bid invitation No. 51-178, issue date 21 Aug., delivery schedule shall be set forth in the call letters when issued.

Valve filler, 1-7 items, bid invitation No. 51-190, issue date 21 Aug., delivery complete by Feb. 1951.

Tester, aircraft, 1-5 items, bid invitation No. 51-197, issue date 24 Aug., delivery within 45 days.

Brass and copper wire, 1-[illegible] items, bid invitation No. 51-185, issue date 21 Aug., delivery starting within 30 days, complete within 90 days.

Rivets, 1-13 items, bid invitation No. 51-181, issue date 11 Aug., delivery [illegible] within 30 days, complete within 225 days.

Stand and level assembly, [illegible] each, bid invitation No. 51-140, issue date 21 Aug., delivery within 15 days.

Rivets, 1-31 items, bid invitation No. 51-176, issue date 21 Aug., delivery schedule shall be set forth in the call letters when issued.

Screws, 1-24 items, bid invitation No. 51-168, issue date 11 Aug., delivery schedule shall be set forth in the call letters when issued.

Screws, 1-106 items, bid invitation No. 51-157, issue date 11 Aug., delivery schedule shall be set forth in the call letters when issued.

Cables, flexible and tow target, [illegible] items, bid invitation No. 51-161, issue date 11 Aug., delivery schedule shall be set forth in the call letters when issued.

Packing, 1-11 items, bid invitation No. 51-155, issue date 18 Aug., delivery schedule shall be set forth in the call letters when issued.

Rivets, 1-34 items, bid invitation No. 51-156, issue date 18 Aug., delivery schedule shall be set forth in the call letters when issued.

Rivets, 1-56 items, bid invitation No. 51-151, issue date 11 Aug., delivery schedule shall be set forth in the call letters when issued.

Detector, carbon monoxide, [illegible] each, bid invitation No. 51-144, issue date 11 Aug., delivery within 60 days.

Relays, 1-2 items, bid invitation No. 51-166, issue date 18 Aug., delivery complete within 180 days.

Sling, bomb hoist, 112 each, bid invitation No. 51-172, issue date 18 Aug., delivery starting within 30 days, complete within 60 days.

Repair, government furnished unserviceable regulators, 2500 each, bid invitation No. 51-174, issue date 18 Aug., delivery complete by Jan. 1951.

Hardware, 1-16 items, bid invitation No. 51-131, opening date 5 Sept., delivery schedule shall be set forth in the call letters when issued.

Substation, 2 each, bid invitation No. 51-152, opening date 5 Sept., delivery by 1 June 1951.

Manifold pressure indicators, [illegible] items, bid invitation No. 51-149, opening date 31 Aug., delivery 75 per month starting Feb. 1951.

Manifold pressure transmitters, 1-3 items, bid invitation No. 51-150, opening date 31 Aug., delivery 40 per month starting in May 1951.

Manifold pressure gages, 1-11 items, bid invitation No. 51-148, opening date 31 Aug., delivery 10 per month starting in Feb. 1951.

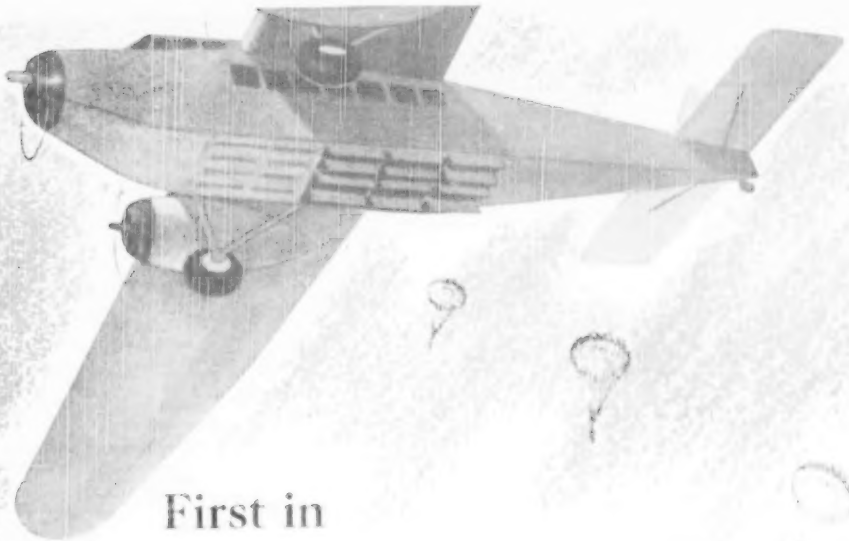
Tester, 75 each, bid invitation No. 51-175, opening date 5 Sept., delivery within 60 days.

Strip, synthetic elastic lacing, 121,[illegible] feet, bid invitation No. 51-189, opening date 5 Sept., delivery starting within 30 days.

Ball bearings, 1-18 items, bid invitation No. 51-164, opening date 8 Sept., delivery starting within 30 days.

Aircraft generators, 1-3 items, bid invitation No. 51-158, opening date 5 Sept., delivery 100 per month starts June 1951.

Aircraft generators, 1-3 items, bid invitation No. 51-159, opening date 5 Sept., delivery 250 units per month starting in Nov. 1950.



First in

SAFETY

The year is 1929! and America is becoming more and more conscious of travel by air. Stanley Switlik is manufacturing parachutes in his Trenton, New Jersey, factory and he's worried. "Can a more efficient method be devised for landing passengers and cargo from airplanes in full flight?"—he asks himself. Then! An idea is born. Why not equip airplanes with trap doors in the belly, then have each seat equipped with a parachute and ripcord attachment. Thus, passengers could be dropped through and gently lowered to earth.

The idea was successfully tried and patented in America and foreign countries. From this dream for emergency exit evolved the present-day ejection seats.

Another *first* in Switlik's continuing research for greater safety.

In November, 1929, "DAS LUFTSCHIFF," published in Berlin, illustrated Stanley Switlik's revolutionary idea as shown here—international acclaim!

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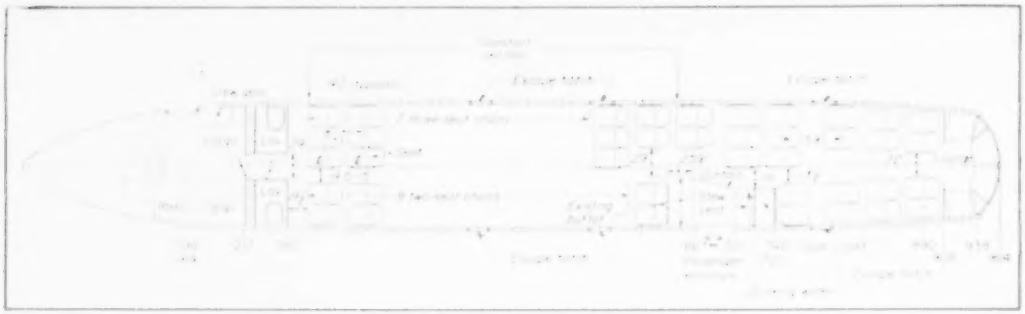

Fuselage plan of AA's DC-6 converted to 70-seat coach for transcontinental service.

Conversion of TWA's Constellation to coach version gives this 81-seat arrangement.

High-Density Conversions Prove Worth

Alteration of DC-6s and Connies for coach service effected at moderate cost. Load factors high.

By Irving Stone

The ever-increasing popularity of air coach travel is putting a premium on space utilization in scheduled commercial transports.

The trend has made feasible the conversion of "luxury" liners to meet the new demand for space economy by afford greater seating capacity and reduced fare.

Lockheed Aircraft Service, Inc., has modified three DC-6s into coach craft now operating on American Airlines' transcontinental runs, and three Constellations for TWA on its cross-country hops. Each carrier operates one coach coast-to-coast per day in each direction and uses the third craft as an extra section on week-ends, generally out from New York on Saturday and back from Los Angeles on Sunday. AA began its DC-6 coach service on Apr. 9 of this year, TWA its Constellation coach service on May 26.

These few months of operation have proved the feasibility of this new inexpensive, top-speed and comfortable air travel.

▶ **Load Factors**—During the first 10 days of DC-6 coach operation (Apr. 9 to 19), AA carried 1630 passengers. This represented a load factor of 86.4 percent.

For the month of May, it was 90.1 percent. (For May, load factor for AA's standard one-stop transcontinental flight was in the eighties.) From Apr. 9 to May 31, load factor for coach travel was 88.5 percent.

TWA's first six days of coach operation gave a load factor of 81.5 percent. (In same period, standard service similar to one-stop coast-to-coast coach operation showed a load factor of 66.2 percent.

By the end of July, TWA's coach load factor was 57.8 percent, standard service load factor, 72.2 percent.

▶ **A New One**—And now AA is putting into service another LAS-modified DC-6 to cope with the increased demand for coach travel.

This fourth coach will allow the line to arrange a more flexible operation on existing schedules by having another coach standby section available.

Cost of the conversions appear very reasonable, particularly when considering the cost of a new aircraft.

Conversion price for the DC-6 and Connie ranges from about $65,000 to $75,000, depending upon the particular configuration modified. Cost of a new DC-6 would probably run $900,000 to $1,000,000, and for a Connie about $1,100,000 or higher.

Major modifications of the aircraft were concerned with interior arrangements.

▶**DC-6 Changes**—First three of AA's DC-6s converted had standard passenger sleeper cabin interiors and were modified from a 44-place arrangement to a 70-seat coach configuration with little appreciable change in center of gravity.

This represented an increased seating capacity of about 59 percent. The fourth conversion, from a standard 52-seat day plane configuration, will give approximately 34 percent seating increase.

The sleeper conversion was effected with an average weight saving of about 885 lb. in effective payload. This was made possible through removal of comparatively heavy berths, using lighter chairs, and cutting bulkhead and plumbing weight.

The cargo compartment has been expanded to allow an increase in above-deck cargo loading of about 1500 lb., retaining a weight per cubic loading of 15 lb./cu. ft.

This compartment, located forward, was also fitted with oxygen, ventilation, lighting and seat-attachment equipment, so that provisions for eight more passengers could be made, if necessary, in this area.

New hat racks are erected for luggage-carrying. A new LAS designed retention device, not yet installed in any coach, would make it possible to carry baggage in the rack without danger of shifting as a result of turbulent air conditions.

The new galley provides sufficient liquid containers, and good accessibility, service and disposal facilities.

▶**DC-6 Coach Seating**—In boosting the seat capacity to accommodate 70 passengers, stress was placed on recovering a high-density arrangement with comfort. The same longitudinal seat spacing (40 in. between centerlines) has been retained, while seat width (now about 17 in.) and aisle width were reduced.

First row of seats begins after the cargo compartment and lavatory area—beginning of the fuselage constant section. This section holds 8 triple seats and 1 double on starboard side, 9 double seats on port side. Aisle width here is 14½ to 15 in., except between two rear doubles, which is about 37 in.

From the end of fuselage constant section to the beginning of the lounge, there are a double, 2 triple and then 3 double seats on starboard side; on the port side are a buffet, entrance area, water dispenser, stowaway seat and coat closet, followed by 4 double seats. Aisle width here is stepped from 19 to 15½ to 22 in.

To accommodate the last two rows of double seats, the upper part of the old Plexiglas partition of the lounge was removed and lower part 43 in.

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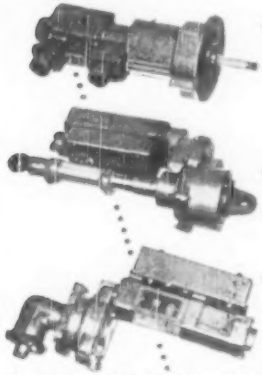

- To solve a difficult pressurization problem on a heavy bomber, Hoover designed this actuator which is controlled by a direct pressure measuring device through a potentiometer. It includes a 9360 to 1 triple planetary reduction gear, and the motor shaft can be braked so sharply that travel of the output shaft is limited to ⅛ degree.
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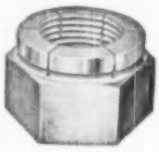

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high; moved back to leave 4 seats in the lounge.

▶ **Connie Changes**—TWA's Constellations which were converted into its Sky Coaches accommodate 81 passengers. This represents an increased seating capacity ranging from 44 to 72 percent, depending on the configuration of the individual plane.

Layout of the Connie coach seating is more straightforward than on the DC-6 coach. On starboard side, there are 16 triple seats, followed by a double and a single. Port side carries 15 double seats, followed by a hostess station, entrance area, galley arrangement with sufficient liquid containers, and coatroom.

Aft portion of the plane carries double lavatory facilities.

Longitudinal seat spacing remains about the same as in standard Constellations. Aisle width is 18 in. for bulk of the arrangement (mid-cabin), stepped to smaller widths forward and aft. Approach area to lavatory in rear of plane is more than ample.

▶ **Structure Changes Small**—For conversion of both craft, comparatively few alterations were required structurally.

The airframe was left substantially intact, except in local areas which were strengthened to support additional floor loading loading of passenger increase.

Additional emergency exits were installed.

Window locations were changed to conform to the new seating arrangements.

And lighting and ventilation installations were necessarily modified for the new layout.

If the future growth of coach travel is at all comparable with that achieved to date, a substantial portion of future transports likely will come off the production line as coach versions.

Panagra Tests Rato in Quito

Tests of jet-assisted takeoffs with four engine Douglas aircraft were recently conducted in Quito, Ecuador, by Panagra, Pan American-Grace Airways.

The tests were in preparation for regular service with four Rato units added to the equipment. Each of the units supplies 400 lbs., and together provide the power of an extra engine.

Company officials said that the Rato takeoffs will make possible, for the first time, four engine service between Quito and points in North America. They added however, that twin-engine operations will continue until the airport has been modernized as planned by the government and the airline.

Base Pressure Can Be Calculated

NACA scientist develops semi-empirical method which replaces earlier inadequate theories.

One chief worry of present-day aerodynamicists is their inability to predict the base pressure drag of a body of revolution traveling at supersonic speeds.

This drag component, the resultant of near-vacuum pressures produced by flow conditions at the base—can be as much as two-thirds of total body drag.

During the current accelerated missile research program, base pressure phenomena have received a large amount of attention. Systematic tests have been made on particular configurations in wind tunnels and in free flight, but there has not been an adequate theoretical basis for correlation and guidance of these tests.

▶ **NACA Contribution**—The National Advisory Committee for Aeronautics has published a new contribution to the art in its Tech. Note 2137 (An Analysis of Base Pressure at Supersonic Velocities and Comparison with Experiment), by Dean R. Chapman, Ames Aeronautical Laboratory, Moffett Field, Calif.

Earlier hypotheses to explain base pressure phenomena in supersonic flow had been advanced by Lees[1], Gadd[2] and von Karman, but it has been generally agreed that these theories have been inadequate. More recently, Cope[3] developed a semi-empirical explanation in which, among other things, he calculated the pressure in the wake from boundary layer flow. To do this, it was necessary to make approximations and assumptions which resulted in obtaining finally only a first approximation.

Chapman's theory is similar to Cope's, but was developed independently. The primary purpose of the NACA study was to develop a method which would permit calculation of base pressure on airfoils and bodies without breathing, or tail jets.

▶ **Inviscid Theory**—Last part of Chapman's investigation is devoted to examining the two-dimensional and axially symmetric flow for an inviscid fluid. Conclusion: inviscid flow theory is inadequate for prediction of base pressure and therefore, drag.

In the second part of the study, Chapman develops a semi-empirical theory based in part on inviscid calculations.

Results are presented as plots of base pressure coefficient as a function of a parameter approximately proportional to boundary layer thickness. Available experimental data correlate well with a straight line on such a plot.

Then concluded Chapman:

• **Variation of base pressure** with Reynolds' number is small for high values of RN when the approaching boundary layer is turbulent, and large for low values of RN where the approaching boundary layer is laminar.

• **Effects of body shape** are independent of boundary layer flow, and can be explained on the basis of inviscid calculations.

As a final note, Chapman underscores the need for further experimental data, particularly for two-dimensional flow, for bodies with tail fins attached and for high supersonic Mach numbers in two-dimensional and axially symmetric flow conditions.

References

1. Lees, L.: The Stability of the Laminar Boundary Layer in a Compressible Fluid, NACA TN 1115, p. 444, Oct. 29, 1946, p. 467.
2. Gadd, G. E.: Base Resistance in Gas Jets at Supersonic Initial Speed, Comptes Rendus du 1 Congrès des Sciences, Oct. 14-19, 1949, p. 1448.
3. von Karman, Th. and Moore, N. B.: The Resistance of Slender Bodies Moving at Supersonic Velocities, Trans. of ASME, vol. 54, 1932, p. 44.
4. Cope, W. F.: The Effect of Pressure Gradient on the Base Pressure on Projectiles, Proc. Roy. Soc. 190, 1947, p. 1, Jan. 1947.

Solar Testing Jet Engine Designs

Solar Aircraft Co., which last year did 75 percent of its business supplying components to jet engine manufacturers, has its own jet engines in the experiment stage.

The company's annual report for the year ending Apr. 30, 1950, discloses that it has contracts from USAF and Navy to produce three small gas turbines.

In the experimental stage is an aircraft auxiliary power plant, AAP-80, now under test. It has 74 hr. running time. Two similar engines are 50 percent complete. Second type power plant is the MAP-400, which is on contract for the Bureau of Ships. Third experimental gas turbine is the MPM-45, also contracted for by the Navy.

▶ **Subcontracts**—Products made by Solar for other jet engine manufacturers include ring and tube assemblies and air frames for the Allison J-33 and J-35 turbojet engines, plus inner liners and combustion chambers of various types. These, together with exhaust cones for Allison engines, are manufactured at Solar's Des Moines plant.

Typical of the production at the San Diego plant is the air frame and

HANDY ASSEMBLY "SHOPPING SERVICE"

Emphasizing ease of selection, this mobile parts rack is one of a battery of new, time-saving units supplying Boeing Airplane Co.'s final assembly area in the Seattle, Wash. plant. Overcoming disadvantages of old, slow method of wrapping parts, placing in bags, transporting to shops, unwrapping and redistributing in racks and bins, new carts with parts in plain view are wheeled directly to working station.

One side of the tubular A frames is faced with ¼ in. plywood and tubing and some large parts are tied to hooks with ¼ in. thick cord. Because the parts are shipped to the same location each day, a uniform attachment arrangement is used. Should new parts require another pattern, hooks are moved.

Shelf side of the rack is compartmented for smaller parts and those too bulky for tieing to the hooks.

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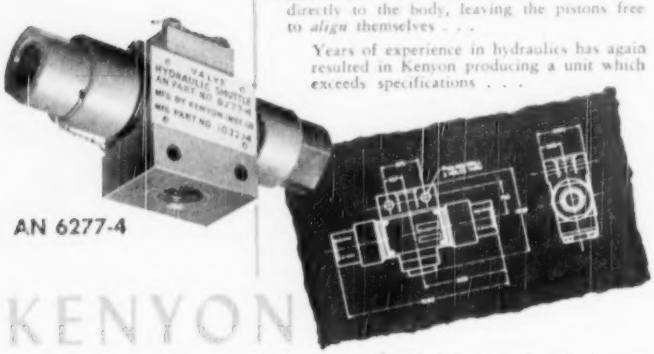

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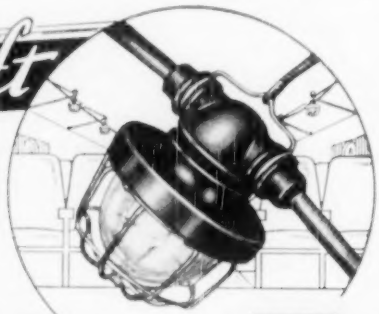

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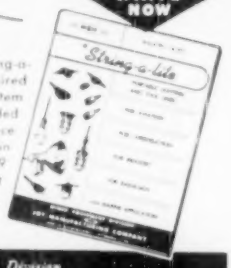

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exhaust cone for the General Electric J-47 engine, as well as the tailpipes for the Lockheed F-80 and the North American B-45. Diffuser assembly for the Westinghouse J-34 engine is also produced there.

Manufacture of exhaust equipment for aircraft piston engines continues in spite of the transition from piston to turbine engines in military aircraft. These sales accounted for 21.4 percent of the dollar volume for the fiscal year.

The company is also active in improving welding techniques and developing heat-resisting ceramics. Since it specializes in working with heat-resisting sheet metal parts for aircraft, this development has a direct application to jet engine work.

▶ **Sales and Profit**—Total sales for the year amounted to $21,488,335, with net earnings, after provision for Federal income taxes and refunds under government contracts, at $1,104,066. This is equivalent to $2.30 earned per common share, after provision for dividends on the outstanding preferred shares, and compares with $2.50 per share earned in the previous fiscal year.

As of Apr. 30, 1950, Solar employed a total of 1877 people, with 1134 at the San Diego plant and the remainder at Des Moines.

Mag-Alloy Wing Flies in F-80

A magnesium-alloy wing has carried a Lockheed F-80 aloft during 120 hr. of flight test time.

This new type of wing (AVIATION WEEK July 4, 1949) has shown no structural defects during the flight program.

Principal advantage of the magnesium-alloy construction stems from the use of plate rather than the skin-plus-stiffener pattern of aluminum alloy. Thus, fewer internal reinforcements are required, and the space saved can be used for increases in fuel space.

More fuel means more range, and in the case of the F-80 the Air Force reports that a 30-percent increase in range is possible.

Bearing Lube Study

Performance of ball and roller bearing lubes are being checked over a wide temperature range in a grease-testing machine developed by The Texas Co. to simulate actual service conditions.

During the test, grease samples are observed under high speed stroboscopic light to determine changes in quality, consistency, texture and color. Also revealed are aeration and leakage tendencies and breakdown from heat and pressure.

High speed motor-driven shaft in the

machine operates a shielded bearing encased in an electrically heated oil bath which can be regulated from room temperature up to values above 300 F.

The test bearing carries 5 grams of grease and is run for 3 min. before heat is applied. Observations are made at 25-deg. increments under the stroboscopic light.

Chip Detectors Prove Their Value

(McGraw-Hill World News)

Stockholm—The "chip detector" for giving early warning of engine failure works fine, Swedish ABA Airlines says.

After ten years flight experience with a device similar to the one being installed by SAAB in the Scandia (AVIATION WEEK May 15), ABA intends to go on fitting chip detectors on all twin-engine planes. The chip detectors on the Scandia are a refinement of the type ABA have found so useful.

▶ **No False Alarms**—No alarms have been caused by small metal chips, non-indicative of engine failure, according to Axel Hinsson, ABA maintenance chief. Such small particles, he says, are present only when the engine is being run in after an overhaul (provided it is kept properly clean).

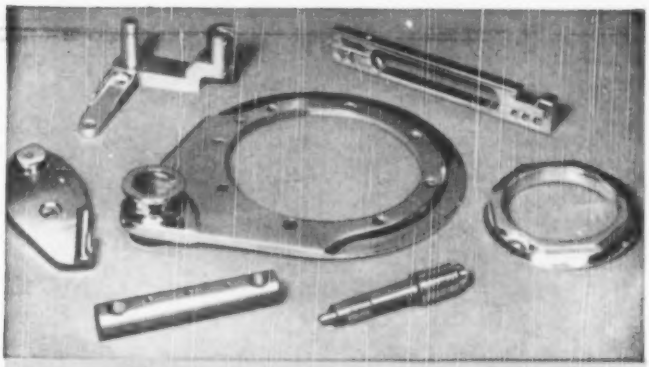
False warnings, on the other hand, have been caused by water condensing in the oil—but this difficulty has been eliminated by causing the oil to circulate. Now when water causes the detector circuit to close, the warning lights blink momentarily. Metal chips keep them lighted.

Several engines have been saved for ABA by the device. Construction has been simpler than the new SAAB construction, with only one warning light (SAAB has one light connected to each of the six electrodes). Neither SAAB's nor ABA's device is magnetic.

Reports also indicate that ABA pilots favor the detector strongly. They like the extra feeling of security it gives. Requests have even been made to have it fitted to four-engine planes. But the company is not contemplating doing this, as it is a more complicated job, and the hazards of one engine failing on a four-engine plane are much less.

Salt-Spray Test

A man-made ocean spray is used to test electrical equipment at the Small Motor division of Westinghouse Electric Corp., Lima, Ohio. Small aircraft motors are exposed to a continuous salt spray, although they may never get such tough duty in actual service, to determine which materials and designs can withstand salt water best.



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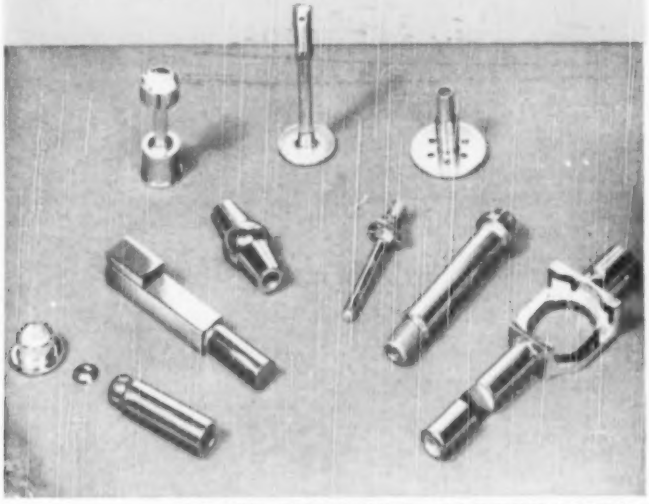

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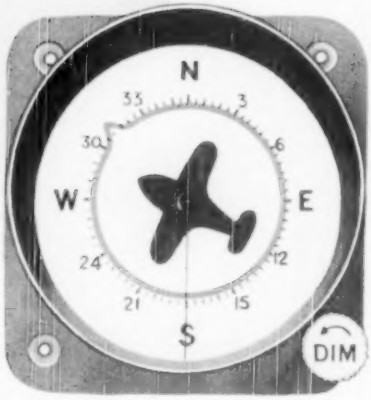

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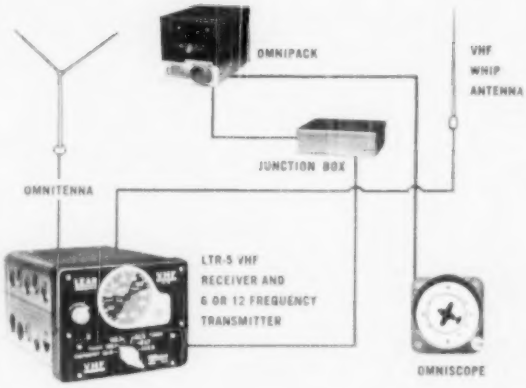

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Preview of Fighters: McDonnell XF-88

Air Force evaluation of interceptor-escorts draws four competitors.

By David A. Anderton

A preview of tomorrow's fighter is being staged for the United States Air Force at Edwards AFB, Calif.

Four of the fastest sweptwing jet aircraft are being evaluated in a long series of flight tests to determine which best meets the basic requirements of AF's new interceptor-escort fighter.

The specifications:

- **Climb:** 30,000 ft. in under five minutes, for interception.
- **Speed:** Supersonic, for speed margin over current jet bombers.
- **Armament:** Missiles—rockets or air-to-air—to replace conventional guns.
- **Automatic control:** Ground radio linkage to autopilot for interception vectoring.

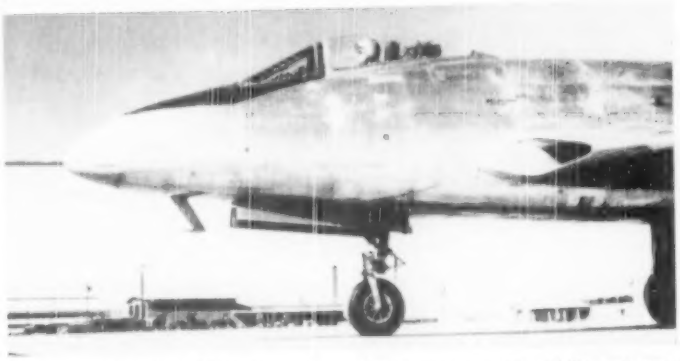
Entries in this current evaluation are Lockheed's twin-jet F-90, North American's single-engined F-93A, Republic's F-84F (ex-YF-96A) and McDonnell's XF-88.

This article is the first in a series of design analysis of these aircraft.

▶ **McDonnell Entry**—First to complete both preliminary and final evaluation trials is McDonnell's XF-88.

Briefly, this airplane is a twin-jet fighter of conventional layout, powered by two Westinghouse J-34 engines, featuring sweptback wings and tail.

Span of the wing is 39 ft. 8 in.; overall length of the aircraft, 54 ft. 1 in.; height, 17 ft. 3 in.



PILOT'S COCKPIT of XF-88 features high, forward position, good visibility over nose.

Gross weight of the airplane started at 15,000 lb. some time ago. Current figure is not available, but estimates run to as high as 27,000 lb.

Development of the airplane began in 1946; the first experimental aircraft was officially recognized to exist in September 1948.

Preliminary evaluation was completed by the Air Force in March 1949, and final evaluation has recently been finished.

McDonnell built two prototype 88s, sent both to Edwards for testing.

▶ **Not Identical Twins**—There are two obvious differences between the first XF-88 (No. 6525) and the second (No. 6526).

Afterburners on the second plane account for one of these. The installation has resulted in a bumped-out contour of the aft fuselage, with some rather awkward intersections on the fuselage belly where the original lines were not deep enough to house afterburner tailpipes.

Somewhat ahead of the afterburners there are two high-speed air inlets. It is likely that they supply auxiliary cooling air for the exhaust sections.

Second difference between the 88s appears in the length of the plastic nose section. The earlier ship had a fairly short nose piece; pictures of the second show the plastic extended back to the next fuselage frame, almost twice the original length. This could mean improved radar, or more of it.

▶ **Front Office**—The pilot sits well forward and high in a pressurized cabin on an ejection seat. His eyes are about level with the top deck line of the fuselage, and he can see down over the nose at about a 15 deg. angle.

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THREE-VIEW of XF-88 shows clean lines.

The bullet-resistant windshield slopes back at about 30 deg., and presents a flat front to the oncoming air. Side panels are free-blown, to match the power-operated, jettisonable canopy.

Defrosting is done electrically on the windshield and with hot air on the rest of the canopy.

Sliding portion of the canopy contains a flush antenna.

▶ **Fuselage Fuel**—Immediately aft of the pilot is fuel storage. There are four cells ranging from the photos and the middle two are of larger capacity. Cells are self-sealing and are shock-mounted on rubber to absorb some of the shock of bullet impact.

Access is through large removable doors which permit hauling out the cells without the need for collapsing them first. Doors are fastened to fuselage frames and two longerons with screws.

▶ **Air Brakes**—On the fuselage sides just above and aft of the jet exhausts, there are air brakes of the clover-gater type. In operation, the leading edge of the brake moves outboard and down. A small fairing ahead of the brake covers the operating linkage.

A number of intermediate positions are possible with the linkage, in addition to the obvious ones of fully open and closed.

▶ **Engine Section**—Westinghouse axial-flow, J-34 turbojets power the XF-88. Static sea level rating on these engines was 3000 lb., but what with development, modification and afterburners, that present rating is anybody's guess.

Probably the engines are slung in alongside a fuselage center keel, like bombs in a bomb bay.

McDonnell says the engines can be

MAIN GEAR of XF-88 retracts inboard.

removed in less than 30 minutes with a minimum of special equipment. A standard Air Force bomb hoist is needed for removing and handling the engine.

In an engine change, fairings around the aft end are detached. The fairings probably are fastened to the lower side longerons and to the engine mounting ring. Removal of fairings would open up the entire lower quadrant of fuselage skin.

Next to come off are mounting bolts and duct clamps. Breaking of all electrical and hydraulic disconnects finishes the preliminary work of the engine change.

All hydraulic and electrical lines which run from the tail or engine section to cockpit control centers in the cockpit are placed in continuous troughs, one on each side of the fuselage. These troughs are covered with removable fairings for accessibility of the lines.

► **Swept Wing**—Main lifting surface of the XF-88 is swept back at the currently favored angle of 35 deg. The 40-ft. span wing has a nominal aerodynamic root chord of about 14 ft., with what looks like a 3:1 taper ratio. Thickness ratio is not readily determinable, but McDonnell says the wing is "quite thin," which could mean around 10 percent.

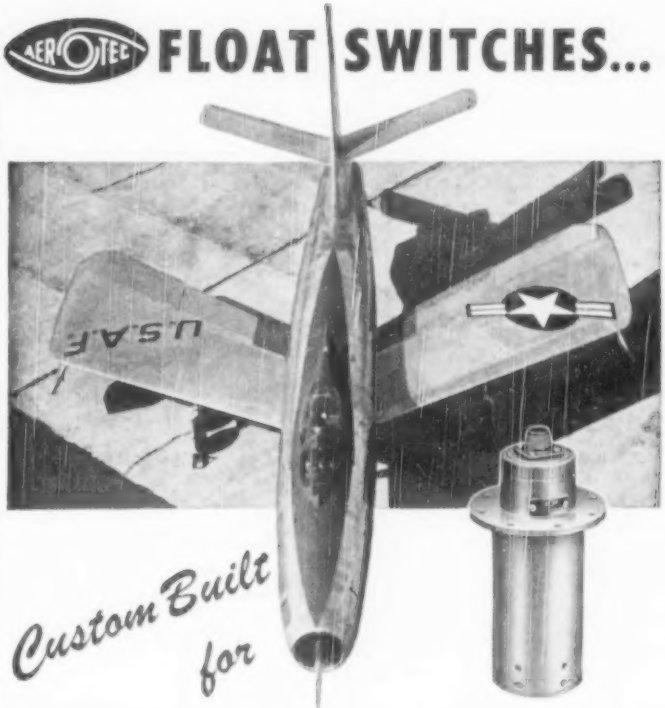
A chordwise boundary layer fence has been fitted to the wing about one-third of the way inboard from the tip. Purpose is to improve the longitudinal characteristics of the wing below the stalling speed.

Leading edge flaps are used to improve control near the stall, both trailing edge and leading edge flaps are used for landing.

Ailerons are power-operated. They

(Continued on page 33)

AEROTEC FLOAT SWITCHES...



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are of the narrowchord type with chord dimension about 20 percent that of the wing.

▶ **Leading Edge Nostrils**—Normal and contours of the wing are modified in plan and section to accommodate the intake ducting for the J-34 engines. Viewed on a plan at the wing outboard, the leading edge peaks forward and the geometric thickness of the wing is increased markedly.

Air intakes are fixed into the space provided by these increased dimensions. Inlet is triangular, with the base at the fuselage and apex on the wing chordal plane. Dimensions are about 30 in. by 13 in.

Rubber thin use an internal boundary layer blood device, and have to go to the trouble of getting rid of the low-energy air by additional ducting. McDonnell engineers have set the inlet outside of the fuselage boundary layer.

At full power the inlets and downstream ducting handle about 28 lb. of air per second apiece.

▶ **Tail Surfaces**—Wing plan form is echoed by both horizontal and vertical tails, except for their lower aspect ratio. Rudder and elevators are power-operated, and appear so alike as to be interchangeable.

Flush antenna is housed in the upper part of the vertical fin. There seems to be a similar installation in a non-metallic fairing between the rudder hinge and the fuselage transport frame.

▶ **Wheel Deal**—Main landing gear is mounted on the wing just inboard of the change in plan contour. Gear retracts around a fore-and-aft axis, inward into the thickened wing section.

Doors over the wheel well close after the wheel is extended, which means less drag during the takeoff run. Most of the shaft well is covered by a fairing behind to the outboard side of the landing gear leg. This fairing does not close over the strut well when the plane is on the ground.

Nosewheel and gear are located almost directly below the cabin. Retraction appears to be forward into a well. A pair of doors with leading edges fastened to the main crossed edge cover the nosewheel well in flight.

▶ **Armament**—Location of the present armament and what it is, is a matter for rumor only. Best guess is six 20mm. cannon later to be augmented or replaced by air-to-air missiles, perhaps mounted externally. McDonnell says that the present aircraft also can carry bombs and rockets externally, in addition to nose guns.

Neither experimental aircraft shows a trace of a blast tube or a cone exhaust. There are two possible locations for guns. If the wing is ruled out (and it is from manufacturing and space considerations)

Other the guns are mounted in the belly of the plane and shoot out below the pilot's nose gear, or the weapons are a temporary installation on the flight test ships only, to be replaced by a more gun installation on any production plane.

▶ **First Mission Completed**—Both models of the XF-88 have been through their Air Force evaluation at Edwards AFB (Muroc), and have returned to the McDonnell factory at St. Louis.

Reports about their possible future vary. For one thing, McDonnell is listed as a Navy factory, which means that AF presumably would get second position to the Navy's Bandit.

It has also been reported (Aviation Week Aug. 21, p. 11) that an Allison J-35 turbojet unit will be added to one of the two 88s in order to utilize the airframe potentialities in flight tests a thin-blade tension of supersonic propellers.

Boeing To Expand Wind Tunnel

Boeing Airplane Co. of Seattle, Wash., will spend $3 million-half to expand its wind tunnel and half to increase its manufacturing facilities, President William M. Allen has announced.

The wind tunnel expansion will open a new field of testing at highly critical transonic and supersonic speeds, Allen said. The present tunnel, with a 16-blade fan propelled by an 18,000-hp. motor, can attain transonic speed only under certain conditions.

▶ **Tunnel Improvements**—Wind tunnel improvements will include:

- **Addition** of a 36,000-hp. motor
- **Replacement** of the fan with two more powerful ones
- **Extension** of the building
- **Strengthening** of the tunnel
- **Tunnel configuration** modifications

Present testing can continue for a year without interruption from the improvement program, which will require 26 months to complete.

▶ **Production Facilities**—Expansion of Boeing's Seattle production facilities includes principally the purchase of new machines. Already on order are two surface machines costing a total of $297,000, a $170,000 planer, and many measure surface treating facilities. One of the two mills will have a bed about [illegible] ft. long, slightly longer than an Oswald mill recently installed at Boeing (with a new arrangement). It is believed to be the largest of its kind in the world.

Still to be ordered are a 7000-ton hammer, for which $300,000 has been budgeted, and five new hammers, which will cost a total of approximately $700,000. Additional balcony area will cost an estimated $170,000.

New Pressure Cell Cuts Error

True response of pickup achieved by elimination of tubing and its contingent phase and amplitude errors.

It long has been conventional in aerodynamic research to measure pressures by pickup cells feeding electronic circuits designed to produce oscillograph traces. The traces represent the pressure variations. Available cells have picked up pressure variations through flexible tubing connections to orifices located in the aircraft surface.

This construction introduces errors both in amplitude and phase, because of complex factors associated with the orifice effect at each end of the tubing, instrument volume, and length, rigidity and damping of the tube.

Recently developed cells of a new design, constructed by Sierra Electronics Corp., San Carlos, Calif., form part of a amplified pressure-measuring system which avoids these errors by eliminating pressure tubing and integrating the measuring diaphragm directly into the surface of the aircraft. The pressure-measuring cells and related oscillator and carrier-channeling equipment are based on developments of Albert L. Erickson and James C. Kyle, engineers at NACA's Ames Aeronautical Laboratory. A closeup of one of the cells (Fig. 1) shows how it threads into a special flange riveted to the skin.

▶ **New System**—Initial design efforts for the new system, according to Paul Byrne, Sierra's chief engineer, were instituted to eliminate the inherent errors of conventional design. Other design goals included reduction of the number of items of instrumentation, and general simplification of the techniques used in making wind tunnel and flight pressure studies. These include determinations of lift, hinge and pitching moments, flutter, transient and gust studies.

All the equipment used in two-channel operation is illustrated in Fig. 2. It includes a 2000-cps oscillator and power supply in the container shown on the left (64 by 42 by 113 in., 104 lb.) and a two-channel bandpass amplifier seen at right (44 by 54 by 74 in., 84 lb.).

Cells are shown connected to the two signal inputs. Power connection from left, utilizes 115v., 400-cps supply. Oscillograph feed can be seen connecting to the rear of the amplifier unit.

This equipment has been designed specially for flight and wind tunnel application. Cells and other equipment are tested for operation in the usual temperature range. Precautions have been taken to insure noise-free operation under conditions of extreme vibration or local electrical disturbance.

Each type of cell (Fig. 3) comprises a cylindrical body with a taut diaphragm at one end. A strain-sensitive element is attached to the inner surface of the diaphragm and electrical leads are brought out through an insulating plug at the cylinder's other end.

A small metal nipple provides a means of connecting to a reference pressure—either free-stream static pressure or a calibrating pressure.

▶ **Cell Attachment**—As Fig. 1 shows, the cell cylinder threads into an adapter ring which has the double purpose of serves a means for aligning the cell diaphragm with the outer skin surface. At the same time it prevents skin stresses from acting on the diaphragm.

Byrne reports that the different lengths of cylinders permit installation in any thickness of wall. The angular-truncated type is for use within ¼ of an inch of trailing edge.

Having a natural frequency of approximately 2,400 cps., the cells exhibit a uniform frequency response between 0 and 500 cps. Styles are made in a range of sensitivities from 0 to ± 0.2 to 0 to ± 10 psi. Phase fidelity throughout exhibits no measurable error. Accuracy and repeatability fall within 2 percent for all ranges and all readings.

Because the diaphragm is not connected by linkage with any type of mass, the design inherently is free of vibration problems.

▶ **Research Advantage**—In addition to simplifying the reading and reduction of data from single cells, the new system offers a number of other advances. Perhaps the most important is the remarkable increase in flight research potential because it is now possible to instrument an airplane so that normal flight at one spanwise station can be determined using only one amplifier unit. The number of amplifiers usable determining how complete a spanwise study can be made.

Absence of error-generation in the flush-mounted cells makes it feasible to take the sum or difference of an array of cells electrically.

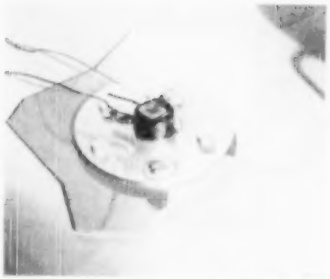

Fig. 1: Closeup of reverse side of skin section, showing new flush-mounted cell threaded into flange riveted to skin.

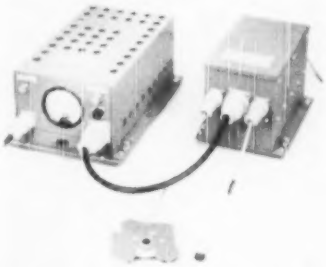

Fig. 2: Equipment setup for two-channel, flush-mounted cell operation. Oscillator and power supply unit shown at left; twin-channel bandpass amplifier at right.

Fig. 3: Group of cells and accessories include types ¼ and 1 in. long, together with mounting flange, and angular-truncated type for trailing edge application.

▶ **Circuits**—The cells (or cell) are placed in a bridge circuit fed by the oscillator. Variations in cell resistance amplitude modulate the carrier.

This output goes to a bandpass amplifier driving a conventional recording oscillograph.

An exclusive circuit automatically makes adjustment to insure that the recorded curves will never run off the scale of the oscillograph.

▶ **Applications**—As an example of flight application under conventional space

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limitations, 6 amplifiers (occupying less than 1 cu. ft., including power supply) will completely instrument three stations on a wing for normal force.

The airplane is flown in accelerated flight to determine rate and type of flow buildup and breakdown in very slow changes of angle of attack. The static slope of the normal force curves is determined and a complete record obtained in a very short flight.

The same equipment is flown through gusts and into buffeting regions to determine aerodynamic forces involved and the rate of change of these forces. Hinge moment about a predetermined axis can also be measured.

Because of the small size and weight of the system, cells can be installed on guided missiles having space for the related equipment.

Amplifier outputs are fed to normal telemetering facilities.

Flutter derivatives can be measured directly.

▶ **Rakes**—Special survey rakes for measuring fluctuating total head and angle in subsonic or supersonic wakes are available for windtunnel or flight. They can be used to particular advantage in very small tunnels or for analyzing unsteady flow conditions in tunnels or duct systems.

In general windtunnel work, the flush-mounted cells and related equipment allow the direct measurement of all nonsteady aerodynamic forces including flutter derivatives. Since they measure aerodynamic forces directly, inertia, mechanical damping, and spring effects can be neglected in obtaining correct answers.

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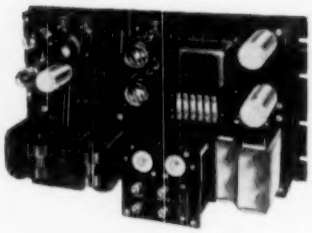

Rear View of IES101R

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Costing $350,000, the trainer consists of three basic units: instructor console, pilot cockpit and electronic computers. The mobile trainer readily can be moved by truck to any training area in the United States or can be stowed aboard ship. It is 32 ft. long and is completely air-conditioned and sound-proofed. The Navy has ordered ten so far, but plans additional quantity procurement if training schedules demand it.

▶ **Transition Training**—While capable of being utilized in the training of fledgling pilots, the trainer is designed primarily for use in transition of rated pilots from reciprocating to jet engine aircraft.

The Navy estimates use of the trainer will cut in half the normal two-week training period now required in transition to the Grumman F9F jet.

One trainer, because of its ability to simulate any flight condition continuously without the normal on the ground maintenance required for actual aircraft, frees ten F9Fs on transitional pilot

assignment. This permits assignment to combat readiness of F9Fs which would normally be required for training.

In a demonstration at Erco's Riverdale, Md., laboratory, Navy showed how the F9F-2 mobile trainer is designed to simulate the behavior of the actual plane under all conditions encountered in flight.

▶ **Instructor's Console**—Forward in the trailer is the instructor's console which contains a duplicate set of pilot instruments, special controls for setting up aircraft failures, indication lights and course plotting boards. Located opposite the console is a radio aids cabinet housing all the radio aids and sound simulation equipment needed in the training course.

About midway in the trailer is the trainee cockpit, a duplicate of the F9F-2 cockpit, complete with all instruments which are found in the actual aircraft.

Covering cockpit is a translucent hood upon which cloud effects and lightning flashes may be projected to provide realistic flight conditions for the pilot.

Behind the pilot cockpit in enclosed metal cabinets, are ten rubber, shock-mounted electronic computers which simulate all of the aerodynamic characteristics of the F9F-2. These are controlled by the instructor from his position.

He sets up a problem depending upon the ability and experience of the pilot being instructed.

It may include conditions of fire, engine trouble, off course, or any other control instrument failure. Problems to emphasize existing flight doctrines or to stress faults and shortcomings of an individual pilot may be presented and overcome.

Through his duplicate set of controls, switches and indicators, the instructor can observe and direct the trainee's remedial action in any particular condition.

The navigational practice which can be obtained in the new trainer is especially useful because it can simulate extended instrument flights to the extent of the operational limits of the actual aircraft. The trainer can also simulate GCA approaches and landing technique problems.

The pilot flying the mobile trainer operates the same controls and receives the same responses and sensations during the in-cockpit training period as he would receive when flying the actual aircraft.

These are given by electrical, mechanical, electronic and electro-mechanical computers which react to the trainee's controls and to the "orders" given by the instructor from the training console.

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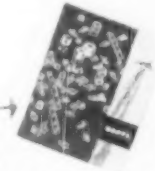

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FINANCIAL

Cargo Carriers Feel Mobilization

Increased tempo benefits the Flying Tiger Line and California Eastern, but good management also helps.

The speeded mobilization tempo set in the Korean war has sharply improved the position and outlook of a number of the so-called nonscheduled carriers. This segment of air transportation was, for the most part, floundering and gradually being forced out of business by a combination of regulatory decisions and cold economics.

With the outbreak of the Korean affair, the tightening demand for air transport facilities breathed new vitality into this general group of companies, some of which had already begun to demonstrate increased strength.

▶ **Tigers' Tale**—The Flying Tiger Line affords an interesting example of this complete transition. Starting life as a non-scheduled air cargo carrier, the Flying Tigers, in August, 1949, received recognized status through a Civil Aeronautics Board award of a five-year air freight certificate of public convenience and necessity. Despite this authorization, the company did not experience any profitable results from its air freight.

While a profit for the first time in its four-year history was reported for the year ended June 30, 1949, this showing was due entirely to lease rentals from its planes and income received from maintenance work. Earnings for the year ended June 30, 1950, are generally estimated at around $380,000, or about 70 cents per share. This would compare with reported earnings of $123,020 or 16 cents a share for the previous fiscal year.

In April, 1949, the Flying Tigers floated a 500,000-share stock issue to the public at $5.00 per share. As hostilities mounted, the market price of the stock sank, reaching less than 30 cents a share during 1948. But when charter and leased plane activities began to return moderate profits, the market price of the shares slowly recovered, reaching about $2.00 each in June, 1950.

With the Korean outbreak, the company soon obtained a prime contract estimated to call for gross transportation revenues of around $400,000 to fly the Pacific for the military. It was this spark which soon pushed the market price of the stock up to $4.00 per share.

▶ **Cal Eastern Recovery**—A phenomenal recovery is also taking place in the fortunes of California Eastern Airways. The former non-certificated air cargo carrier, operated by a management since removed, was forced to seek financial relief by filing an action in bankruptcy. This was done under Chapter XI of the bankruptcy Act which permits the reorganization of a company's financial affairs without the appointment of a trustee.

With a new management in control, the operations of the company were gradually shifted to passenger air coach operations. As this was made increasingly difficult by CAB regulations, it withdrew from this direct operation. Instead, it leased its planes to other air coach operators in the nonskeds field.

Results from this activity proved highly profitable to Cal Eastern and were responsible for the $131,435 profit shown for 1949. For the first six months of 1950, the operator recently reported a net operating profit of $85,340 before depreciation or a net profit of $12,765 after this charge.

Earnings of the company have permitted the payment of a total of $243,117 up to June 30, 1950, in liquidating obligations, due unsecured creditors, attorneys and so called tort claims. California Eastern is also participating in the Korean affair with one plane under lease to the military.

▶ **DC-4 Demand**—But the real jackpot for Cal Eastern's improving fortunes comes from the lightening up of the four-engine freight market. DC-4s are very much in demand and available equipment can command premium rentals.

Cal Eastern owned five DC-4s and leased a fifth plane as of Dec. 31, 1949. Its four planes were carried on its books at that date at a net value of $180,425. With two of these DC-4s of the "B" model and the other two slated for conversion into "B" this asset is clearly understated. It is known that a conservative price for this equipment is at least around $275,000 per aircraft at this time.

On this premise, Cal Eastern could probably realize a profit of more than $300,000 on its aircraft if they were sold currently.

With the increasing likelihood of being released from receivership, Cal Eastern's stock has been quick to reflect the improved prospects. When the company's affairs were at low ebb late last year, stock was quoted around 5 cents a share. Recently a level of $1.00 per share was reached. Most of the original stock was priced at $1.00 or better when the company was formed in 1946.

▶ **Forward to Success**—Entirely unrelated to the Korean situation and in a somewhat different category is the consistent progress being made by Emery Air Freight Corp. First in its field, Emery is the only successful air freight forwarder. This operation was officially recognized by the CAB when it awarded temporary Letters of Registration to a group of carriers, to be reviewed for final consideration in 1953.

Emery has been showing a small overall profit since September, 1947. For the 1949 calendar year, it reported net earnings of $25,934—its first annual profit in four years of operation. From a total volume of $350,563 in 1947, Emery has increased its gross revenues to more than $1.1 million during 1949. Having a far less turbulent history than the other operators being discussed, Emery stock has been fairly stable. It was recently quoted around $2.50 a share.

Air freight forwarding is a comparatively new development in air transportation and little understood by many. Emery's activities provide a constructive function to both the shipper and air carrier. By unique approaches in merchandising, Emery has created new sources of business in air cargo.

For example, by special assembling of cartlingers and nesting pieces and shipment by air to distribution centers, net savings have been achieved for shippers and greater freight volume created.

Emery attempts to match speed in the air with speed on the ground. It owns and operates no airplanes. It is therefore in a position to coordinate the fast and freest flights of all airlines with the fastest possible ground services. Outstanding activities have been made established in connection with military transportation such as railroads.

▶ **Volume Builder**—Airlines of first rank the operator, but it is now apparent that the outside service can be profitably utilized as a power adjunct in building up air freight volume. As mobilization activity accelerates industrial production, the services of the air freight forwarders will be sought by a widening group of shippers for a more diversified list of commodities.

The lack of any appreciable change in the fortunes of a number of other non-scheduled carriers as a result of the Korean war again demonstrates the importance of management in any aviation enterprise. For instance, market quotations stated in nominal fractions still prevail for such companies as Evergreen Avia, Inter-Americana and U. S. Airlines. An even greater number of operations in this group has disappeared completely.

—Selig Altschul

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CURTISS WRIGHT

SALES & SERVICE

New Link Role

Student flight training can be cut one-third using synthetic trainer.

Students should be able to pass the private pilot flight test in less than one-third of the 35 hr. now required by the Civil Aeronautics Administration, if new synthetic training and revised instructional methods are used. That is the conclusion of the University of Illinois following an intensive experiment utilizing two sets of students.

One group was given Link practice, while the other group (used as a control) was not. The results of the experiment strongly indicated that private pilots can be trained in ten hours, using revised techniques.

A detailed account of the experiment is recorded in a booklet, "Evaluation of the School Link and Special Methods of Instruction in a Ten-Hour Pilot Flight Training Program," compiled by R. E. Flexman, W. G. Matheny and E. L. Brown. The bulletin can be obtained on request from the University of Illinois, Institute of Aviation, Urbana, Ill.

▶ **Conditions**—Forty-seven students were selected. Of these, 23 received Link training. Eight instructors were used, with instruction experience ranging from none to over 2500 hr. Only one instructor had previously taught with the Link.

All students were trained to intellectual proficiency in a group of maneuvers before attempting them. When the subjects in the control group reached this level, they attempted the maneuvers in an aircraft (65-hp. Aeronca tandem). The Link subjects practiced their maneuvers in the synthetic trainer, then in the Aeronca. Both groups of students received an equal amount of aircraft time.

▶ **Rating Setup**—On completion of ten hours of flight time, each student received two private pilot tests. The first flight tests was given by CAA air safety agents, with students assigned at random. The second flight examination was conducted by private pilot flight examiners, with students again assigned at random. The examiners were not informed of the type of training received by any student, except that they had had ten hours of flight time. The type of training received was further concealed by adding seven private pilot "fingers," with about 100 hr. flight time, to the groups being tested.

▶ **Analysis Summary**—An analysis of data compiled during the experiment brought out the following points:

- **The Link group** showed a significantly higher mean score than the control group.
- **The criterion of pass or fail** on the flight test favored the Link group, but not at a high degree of statistical significance.
- **In number of items failed,** the analysis showed that a significantly smaller number of Link-trained students failed four or more items than in the control group.

CAA Flight Tests Stall Indicators

The stall warning indicator comes out with top marks in a new report on lightplane stalls conducted by the National Research Council under a contract from Civil Aeronautics Administration. The study is entitled "Stall Recovery and Stall Warning Instrumentation in a Light Airplane."

Not only will the stall warning indicator help the pilot avoid a stall, say the researchers, but it can also be used as a flight instrument to indicate proper stall recovery practice and the best and safest angles of climb and glide. Dean R. Brimhall, CAA's coordinator for research, has recommended that the findings be utilized in revision of CAA manuals and training publications.

▶ **Research Procedure**—The tests were made with a Piper J-3 fitted with a stall warning device, an angle of attack indicator and a radio altimeter. Two test pilots put the plane through 11 different maneuvers selected on the basis of interviews with 40 flight instructors.

Seven methods of recovering from a straight-ahead climbing-power stall were evaluated and 14 methods of recovering from a straight-ahead cruising power stall. Stalls in straight-ahead flight with reduced power, in climbing, gliding and steep turns, and under varying degrees of turbulence were also studied and are covered in detail.

The researchers found that recovery from a stall by holding the nose of the plane on the horizon takes longer, but there is less altitude loss than is incurred by dropping the nose to effect recovery. The altitude saving in some cases exceeds 100 ft. and in certain maneuvers recovery can be made with a loss of less than 50 ft.

The experimental Cub used for the studies is now being utilized by safety agents in the various CAA regions to demonstrate the practical applications of the report's findings.

BRIEFING FOR DEALERS AND DISTRIBUTORS

▶ **Radio Credit Card**—Further use of the aviation credit card idea has been made by Wilson Radio Co. Cards issued to its customers enable them to get serviced at any of the firm's three locations in Texas and Oklahoma. Idea originated with the customers.

▶ **New Parker Outlet**—Adco Industries, Ft. Worth, Tex., has been appointed distributor for aircraft O-rings made by Parker Appliance Co.

SOLID NATA BACKERS

The happy gentleman in the loud shirt is National Aviation Trades Asstt. head, Art Carey, receiving $1140 contribution from Harry Shaffer of Inter-State Credit Corp. on behalf of the Minnesota Fixed Base Operators. G. B. Van Dusen (left) and B. G. Vandre, president of the operators' group in Minnesota, look on. The money will be used to continue NATA work in Washington.

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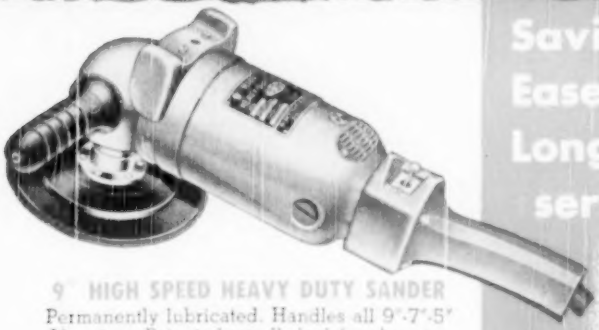

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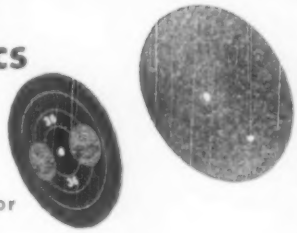

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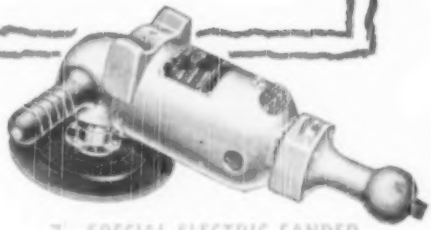

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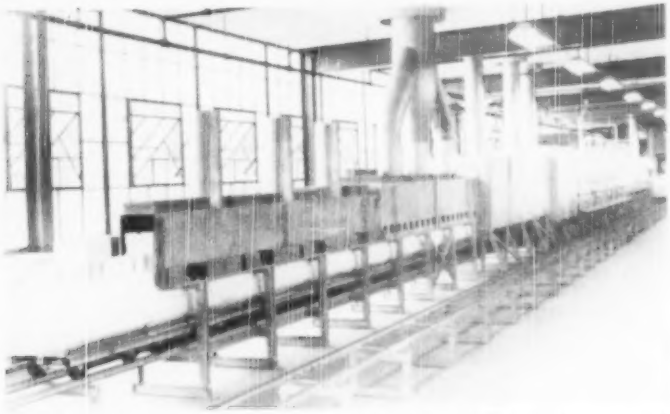


INSIDE BG's ceramic plant. The 125-foot-long, gas-fired kiln heats aluminum oxide insulators to 3000 deg. F. Heating section is at right, cooling section at left.

BG Plug Licking Fouling Problem

Conversion to new RB27R's from RB19R-2's may be easily accomplished during sparkplug overhaul period.

BG Corp's research program to produce an aircraft sparkplug that will consistently last a full engine change without removal seems to be near success in the RB27R. In a few months this plug has demonstrated its ability to function at least 650 hr. between overhauls, and has been adopted as standard equipment by two airlines.

Designed primarily to provide better scavenging action around the electrodes and thus reduce tendency to foul, the RB27R is used on Braniff's DC-6's and Continental's Convair 240s among others.

Braniff has converted 90 percent of its older RB19R-2 plugs to the RB27R. The older plug may be converted at overhaul without additional cost. BNF has established a 650-hr. overhaul period for the units, according to BG, which asserts that the low tension ignition systems mounted on the R-2800 P & W engines contribute in no small measure to reduction of electrode erosion and therefore longer plug life (AVIATION WEEK Aug. 7, p. 17).

The RB27R has been CAA approved for installation in all of the P & W engines from the R-1830 to the R-4360. P & W has also approved the plug for service evaluation.

Now that low tension ignition has aided in solving the erosion problem and plug design helped ease the fouling headaches, BG feels that the electrode end of the plug is less likely to give trouble than the barrel, where contamination by oil and shit may cause flashover after 500/900 hr. of operation.

Aircraft engines now have an average overhaul period of about 1200 hr. so the contamination problem has to be licked in order to achieve the full engine change goal.

► **Sealed Barrels**—W. J. Carr, assistant to the president, told AVIATION WEEK that, in his opinion, a positive seal must be provided between the elbow and the barrel of the plug. He quickly sketched out a method case cuts that has been devised for installation on R-4360 engines. The modification has been approved by the USAF, he added. The same installation is currently found on gas turbine igniters.

Principle is to seal hermetically the barrel of the plug so that any foreign matter likely to promote flashover is kept out. The rubber seal bears on the interior of the barrel wall, the upper end of the ceramic insulator and the center wire lead, thus completely sealing the interior of the barrel.

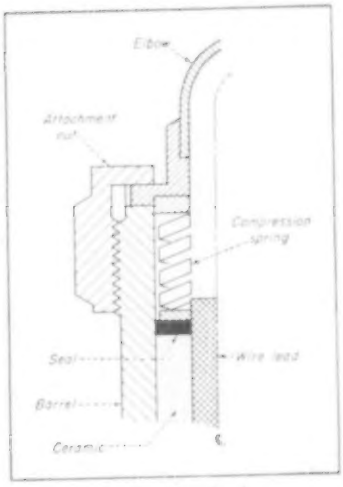
While desirable during ground and low altitude operation, the real advantages of sealing come with high altitude flying when the barrel of the plugs tend to "breathe" due to large variation in atmospheric pressure. This is particularly true during descent. Then dewer oil, often laden with oil, seeps through the top of the plugs.

► **Design Differences**—In order to provide a seal well of sufficient size, and a one-piece, thicker, sturdier ceramic insulator (desirable because of greater resistance to flashover), BG engineers increased the size of the barrel and the terminal attachment thread from ¾ in. to ⅞ in. This admittedly will cause a conversion problem, but Carr believes that the advantages of sealing will make the changeover worth while. He pulled a sample plug embodying these features out of his desk drawer. The plug, labeled the RB23R, is being produced for the military. Electrode assembly is identical to the RB27R.

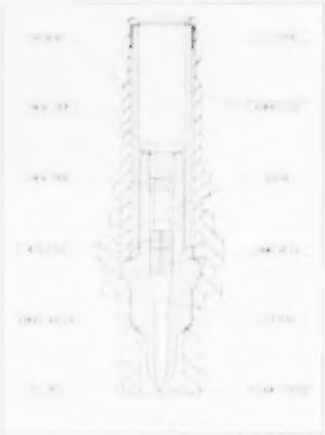
► **Jewelry to Sparkplugs**—The BG Corp. is an outstanding example of a non-aviation firm that got into aviation for war purposes (World War I) and found the field attractive enough to stay. It originally was a jewelry firm on Maiden Lane, in New York's financial district.

A machinist named Brewster (whence Brewster-Goldsmith, then BG) headed experimental work for the Navy. From this came the first plug, the IX, produced in 1918. This was a nickel electrode, mica-insulated plug. By the end of the twenties, BG was one of the foremost aviation sparkplug manufacturers, and it gave up the jewelry business for good in 1933.

Most recent addition to BG's manufacturing facilities is a modern ceramics plant opened in 1942 in Ridgefield, N. J. Here, aluminum oxide ceramic insulators for plugs, thermocouples and the like are fired in 125-ft. long kilns at temperatures up to 3000F.



A type of barrel seal.



Sectional view of BG's new sparkplug

▶ **Demountable and Platinum**—Long an advocate of the demountable sparkplug (worn out plugs can be renovated at a substantial saving over the cost of a new plug), BG claims to have pioneered the fine wire type, platinum electrode sparkplug in this country. Development closely followed the experiments of the British firm, KLG, with whom BG has a working agreement.*

Platinum has exhibited many desirable features as an electrode material, but Richard Goldsmith, BG's president, admitted that the fact it is an expensive and a strategic metal is a deterrent to its use. He indicated that his company is doing serious metallurgic research in hopes of finding a suitable substitute for platinum.

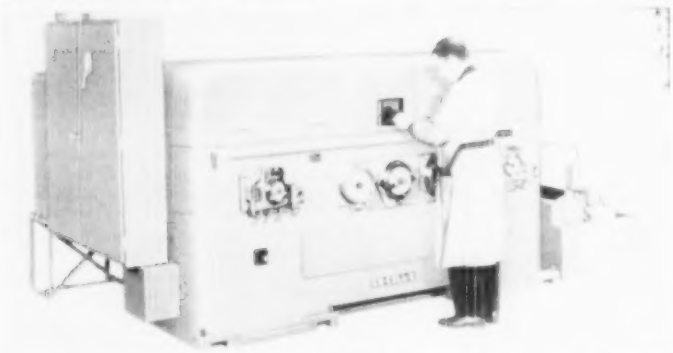
BG is also turning out an expendable, mass-electrode type plug, the 761S, to keep abreast of competition. BG engineers say Pratt & Whitney and military service evaluation tests of this plug will be completed this year.

▶ **Automobile to Jet**—The BG factory, occupying several floors of a skyscraper located a stone's throw from Manhattan's busy Radio City, is turning out an ever-increasing variety of sparkplugs and related products. Plugs for passenger cars, trucks, heavy industrial engines are rolling off the assembly lines.

A major military effort is the development of tail pipe thermocouples and a wide and weird assortment of jet engine and afterburner igniters.

Still of prime importance, however, is development of the aircraft sparkplug, particularly the RB27R. BG is pleased with the large roster of airlines, domestic and foreign, who are evaluating this unit. Among them are: Pan American World Airways (both Latin American and Pacific Alaska divisions), United Air Lines, American Airlines, Mid-Continent Airlines, Trans Texas Airlines, Pioneer Airlines, Scandinavian Airways System, KLM Royal Dutch Airlines and Swissair.

NEW AVIATION PRODUCTS



Grinding of Jet Blades Simplified

Development of a new part often starts a chain reaction in many industries, stimulating development of equipment to serve in its manufacture. A large machine made of hundreds of parts may be needed to process a single small part.

The jet blade is an example. Among other equipment, it has brought about development of the new "Precision Two-Wheel Form Grinder."

This relatively large machine, marketed by the Ex-Cell-O Corp., enables unskilled operators, through simplified controls and automatic functions, to carry out precision grinding on jet blades with speed, according to the company. Ex-Cell-O says the grinder has proven itself in 15 months of steady production work involving finished processing of these blades.

It uses two 24-in. diamond-dressed grinding wheels to finish both sides of the root form of a blade simultaneously. It also will grind dovetail or pinetree forms of various sizes. Blades are held in fixtures that can be removed from the machine and accommodate one or more blades, depending on size.

To operate, the attendant places a loaded fixture on the machine slide, presses the "clamp" button, then the "start cycle" button. While one blade is being ground he can remove a finished blade from another fixture, reload it and check the finished part.

Inside the machine, the blade, secured in its fixture, is automatically carried on the machine slide to the grinding wheels, reciprocated between the wheels for predetermined number of strokes at a specific speed. The grinding wheels feed toward the work at a predetermined rate until the finished size of the blade is reached. After grinding is completed, the slide carrying the blade fixture automatically returns to the forward position for reloading, the fixture is unclamped and the feed mechanism reset for the next cycle. Address: 1200 Oakman Blvd., Detroit.

Fog Chasers

A new liquid, developed to prevent fogging on glass and plastic in humid and low-temperature weather, is being offered by Master, 4444 Brooklyn Ave., Los Angeles 22.

The company claims the liquid, "Fog-gone," remains effective for a longer period and at lower temperatures than any similar product. It says a single application has prevented fogging for more than three weeks.

Fog-gone has a petroleum derivative base and contains silicone, among other ingredients. These do not include alcohol or glycerin, however. The new fog inhibitor is packaged in 4-oz., polyethylene plastic "squeeze-spray" bottles. For industry users, it comes in gallon and 4-gal. containers with separate plastic bottle dispensers.

Another line of fog chasers has been placed on the market by the Carhoff Co., 9321 Buckeye Rd., Cleveland. These are "No-Fog" liquid, designed to clean and prevent fogging on goggles, welding lenses, photographic lenses, mirrors and other parts, and No-Fog Glass Cleaner for use on large surfaces such as windshields.

Carhoff says its products have demonstrated "unusual ability to clean and polish and at the same time . . . prevent dirt and fog from gathering on the cleaned surface too quickly."

New Actuator

A new heavy-duty linear actuator, Linear, has been placed on the equipment counter by Airborne Accessories Corp., 25 Montgomery St., Hillside 7, N. J. The actuator was designed "to meet the requirements of stabilizer adjustments on a new sweptwing version of a production M-fighter."

The unit is intended for intermittent operation in an ambient temperature of 250 deg. F. Static capacity in tension or compression is about 20,000 lb., and the maximum operating load is 7200 lb. Normal operating speed is 1 in./sec. under an opposing load of 2300 lb.

The actuator features a 1.6-hp., 28-v.-dc. motor with a magnetic brake and clutch. It also has reduction gears, a high-efficiency screw jack with a neutrum device and positive end-of-stroke. An externally adjustable cam and clutch, limit switches, a position transmitter—also externally adjustable—and a built-in radio noise filter are included.

Airborne says it complies with all applicable specifications. It weighs 27 lb.

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Hermetically-sealed connectors are offered for use with relays, position indicating, direction finders and other equipment that must be sealed to prevent moisture condensation. "GS" type connectors have AN-type bayonet shells and pin contacts of steel. Contacts are set in glass bead to both the contacts and shell. Parts operate at temperatures up to 500F., meet salt spray tests of 76 hr., and rugged German shock tests. Address: Cannon Electric Development Co., 9201 Humboldt St., Los Angeles 31.

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S&W DC-4, chartered by Air Force, takes aboard first Korean evacuees to leave Japan by air.

Examiner Vetoes Ocean Cargo Bids

Grant of trans-Atlantic freight certificates to TAL and S&W could cause dangerous dilution of traffic.

Two of the nation's largest and most successful nonscheduled international airlines have lost the first skirmish in their fight for all-cargo routes from the U.S. to Europe and the strategic Middle East.

A Civil Aeronautics Board examiner has recommended that the trans-Atlantic freight certificate applications of Seaboard & Western Airlines and Transocean Air Lines be denied. But the two independent operators are looking to the hard lessons of Korea to weigh heavily in their favor when the final decision is made.

▶ **Dangerous Risk Seen**—Certification of Transocean or Seaboard for U.S.-Europe-Middle East all-cargo services at this time would involve a dangerous economic risk, in the opinion of Examiner Warren E. Baker. He said that although the carriers made no request to carry mail, the granting of their route bids would place a burden on the federal treasury. Further, he declared, TAL and S&W might bankrupt themselves if their applications are granted.

Baker indicated that the cost estimates of the applicants are too low and their traffic predictions too high. By drawing business away from Pan American Airways and TWA, the all-cargo operators would probably make larger subsidy payments necessary for these presently certificated U.S. trans-Atlantic lines, the examiner pointed out.

▶ **Traffic Prediction**—Seaboard estimated that during the first year of certificated operations it would carry 4.7 million pounds of cargo eastbound and 3.7 million pounds westbound. This is more than the total commercial cargo handled by all U.S. trans-Atlantic lines in 1949. To effect the additional business, both TAL and Seaboard proposed reducing rates 25 to 50 percent below those presently offered by certificated carriers.

To attain the considerably high load factors necessary for its low rate operation, S&W proposes a flexible, demand-type service without fixed scheduled dates. Transocean plans regular twice-weekly flights from New York, with DC-4s used for the long overwater hops to Shannon, Eire, and C-46s for feeder service to Europe and Middle-Eastern points. Seaboard, already has three C-46s in European feeder service to supplement its DC-4s.

▶ **Duplication Feared**—In opposing the all-cargo route applications, TWA, Pan American and American Overseas Airlines noted that they provide cargo service to almost all the points and areas designated by Transocean and Seaboard. The certificated carriers denied there is enough traffic to support another operator. They pointed to huge unused capacity in their combination passenger-cargo planes, where they handled 80 percent of their freight.

Baker cautioned that even the moderate rate reductions proposed by Transocean and Seaboard would narrow their profit margin dangerously and might fail to increase traffic significantly. If this is true, he observed, the drastic tariff cuts necessary to develop mass transportation of international cargo must await further improvements on aircraft which would permit lower operating costs.

▶ **International Problems**—The international freight field differs substantially from the domestic, Baker emphasized. He believes the circumstances which influenced CAB to certificate Slick Airways, the Flying Tiger Line and U.S. Airlines in the domestic air freight case last year do not govern the present proceeding.

"International commerce is more subject to the vagaries and whims of individuals and governments. It has long been subject to import and export controls, monetary restrictions and other limitations dictated by national interests rather than by the interests of international commerce alone. In a field so subjected to restrictions, it would seem wise to proceed with caution," Baker warned.

The examiner said it could not be seriously contended that trans-Atlantic air freight will not be developed without certification of Transocean and Seaboard. "Most of the public benefits alleged by the applicants can be provided by presently certificated carriers (U.S. and foreign)," Baker asserted.

▶ **Ability Conceded**—Baker did not challenge the ability of Transocean and Seaboard to provide the proposed new service. Both carriers have been in business since 1946 and can point to four profitable years of world-wide operations.

Transocean and Seaboard are outstanding among the handful of U.S. uncertificated carriers whose operations have come close to providing the "tramp incidental income of the air" envisioned by former CAB Chairman James M. Landis. Search restricted to many of their services by CAB regulations, TAL and S&W have sent their ships wherever aulift was needed.

Examiner Baker's report was issued at a time when Transocean and Seaboard were top-deep in the trans-Pacific aulift under contract with the military. All seven of TAL's four-engine equipment was engaged in the operation, and four out of Seaboard's

six DC-4s were similarly occupied.

▶ **Johnny-on-the-Spot**—Seaboard was the first commercial airline to make a flight to Tokyo in the present emergency.

At 6 pm., July 4, less than a week after the outbreak of hostilities, S&W received orders to send planes to the Pacific. By noon the next day, a Seaboard DC-4, "Singapore Trader," was on its way from Idlewild Airport, N. Y., to the Air Force base at Fairfield, Calif. And at noon, July 5, the ship was flying to Japan with a load of high-priority personnel and cargo.

The military has benefited by the flexibility of Transocean and Seaboard operations on several previous occasions, especially during the Berlin Airlift.

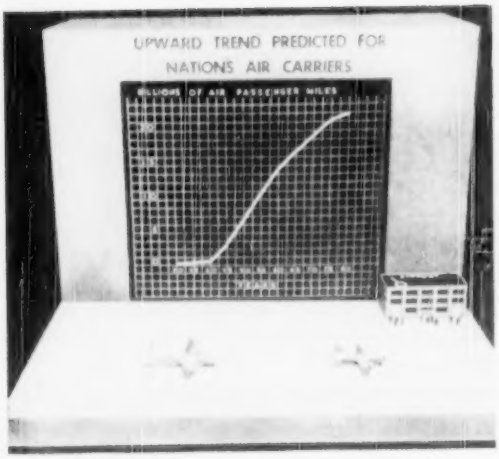
It is this role of global backstopper for the Military Air Transport Service that has won for Seaboard and Transocean appreciation and strong support from high officials in the Department of Defense.

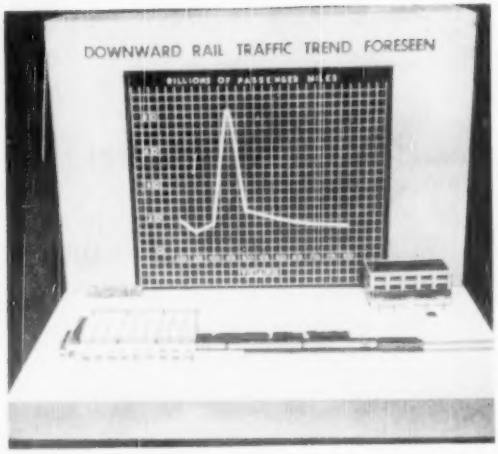
▶ **White House Eyed**—As in all foreign route cases, the President, not the Civil Aeronautics Board, will be the final judge. TAL and S&W hope that their past services in the interest of national defense will be given serious consideration when the White House makes its decision on trans-Atlantic cargo routes.

Without a certificate, the two independent operators may experience rough going in the future. Neither has ever attempted to participate in the domestic air coach market. Nevertheless, they have run afoul of CAB's economic regulations and now may be considered "on probation."

▶ **Violations Alleged**—Less than three months ago, CAB found the two carriers guilty of "knowing and willful" violations of the Civil Aeronautics Act and ordered them to desist from future violations (AVIATION WEEK June 12). The Board said Seaboard had operated illegal regular cargo service between the U. S. and Europe and that Transocean Air Lines had violated the law by carrying passengers in foreign air transportation.

TWA, Pan American and American Overseas Airlines contend that even if CAB should decide that the proposed all-cargo routes requested by Transocean and Seaboard are required in the public interest, the non-scheduled carriers' violation of economic regulations show that the two independents are "unfit" to conduct the service.





STEEP CLIMB predicted for air travel over the next 50 years is indicated by chart at left. Decline in rail traffic is pictured at right.

Big Air Traffic Boom Seen Ahead

Port of New York Authority study sees spectacular highs for air travel by 1980; rail decline forecast.

A spectacular boom in air transportation which will see domestic airlines carrying more intercity passengers than the railroads by 1970 has been forecast by the Port of New York Authority.

By 1980, the study predicts, total domestic intercity passenger miles flown by the airlines will increase to more than 22.3 billion and account for over 45 percent of the common carrier market. This represents a gain of about 238 percent over the 6.6 billion passenger miles flown in 1949.

▶ **Rail Decline**—Intercity bus travel is expected to rise from about 21.3 billion passenger miles in 1949 to 28.7 billion in 1980, up 10 percent. But rail business during the same period is believed likely to continue its downward trend, falling off 42 percent from 29.8 billion in 1949 to 17 billion in 1980.

While air and bus travel gains are expected to outweigh rail passenger losses, the overall business increase for the three common carriers does not measure up to those predicted for the private automobile. Automobiles currently account for about 66 percent of total intercity passenger miles. Between 1949 and 1980, automobile transportation is expected to rise 58 percent, compared with only 9.5 percent for the common carriers as a group.

▶ **Long Haul Dominance**—The Port Authority believes that domestic air transport in another three decades will carry almost all of the common carrier passenger traffic moving over 1000 miles.

Airplanes are also expected to handle more than half of the common carrier passenger traffic moving between 150 and 1000 miles but an insignificant part of the travel under 150 miles.

The survey, which was made in an effort to determine New York City's long-term needs for handling air traffic, forecasts that the metropolitan area will continue to handle about one-fourth of the nation's air passengers. Four-fifths of New York-Newark's present air passengers are business travelers, but future growth is expected to come in large measure from personal travel.

▶ **International Traffic**—Overseas travel between the U. S. and other countries is expected to double by 1980. And at that time two-thirds of the passengers will use airplanes. During 1949, air

generation of total U. S. international air passenger travel will only 32 percent.

Technological development of international air transport will account for its increasing share of overall business, the survey explains. It says speeds of over 500 mph. will cut present transatlantic air travel time in half. Besides offering an increase in comfort through reduction of noise levels and vibration, the future overseas jet transport is seen holding promise of eventual reductions in flight costs and fares.

▶ **Cargo Outlook**—Turning to domestic air cargo (freight and express), the Port Authority anticipates a unusual increase between 1949 and 1980, although the traffic will still be limited to items moving relatively long distances and for which air speed offers substantial marketing and distribution benefits.

It is also predicted that air cargo costs will decline to a point justifying 25 percent reductions in current air freight rate levels, which average 18 cents a ton mile.

Great bulk of rail freight is far beyond the ken of the airlines. In 1949, for instance, the railroads carried two-thirds of the domestic cargo tonnage, with its present moving at actual yield averaging 41 tons miles and 2 cents approximating one cent a ton mile, one-eighteenth the rate charged for air freight.

Combined domestic air freight and express tonnage was about 189,000 in 1949. The Port Authority study expects volume to reach 211,000 tons this year, 370,000 by 1955, 575,000 by 1960, 1 million by 1970 and 1.5 million by 1980.

A sharp increase in overseas air cargo is also foreseen. From an estimated 50,800 tons of U. S.-originated overseas air cargo in 1950, volume is expected to rise to 85,000 tons in 1955, 122,000 in 1960, 207,000 in 1970 and 303,000 in 1980.

The Port Authority expects the federal government to adopt a program which will see air transportation of all first-class mail moving over 1000 miles after 1960. All first-class mail moving over 500 miles is seen moving by plane after 1965.

GATHERED AT THE CLINIC are Warren Dickenson of Douglas Aircraft; Ed Brady, Radio Station KNBC; G. T. Cussen, Flying Tigers; W. W. Dawes, United Air Lines; D. A. Buck, Boeing Airplane; and Louis J. Mourman, Jr., Slick Airways.

Clinic Studies Freight Problems

California meeting suggests sharper merchandi-ing, better ground handling, more realistic accounting.

San Francisco—Specialists consulting on air cargo problems at the California Air Freight Clinic in Oakland late in August have come up with several prescriptions for boosting volume and profit.

• **More effective merchandising** is needed. Air cargo must be sold to businessmen not simply as fast transportation, but as a means for increasing production, reducing sales and distribution costs, widening markets and increasing the rate of capital turnover.

• **Ground handling techniques** must be improved, for more efficiency and lower costs.

Loading and unloading skills must be emphasized—every product damaged discredits air cargo's sales pitch for moving quality goods. Coordination is needed among shippers, carriers and air freighters to reduce the mounting costs of getting the product from point of origin to plane, and from plane to final destination.

• **Air cargo accounting** must be more realistic. The industry tends to look only at direct costs when it prices its product, and projects its operations into the future without full realization that many of its planes were bought as war surplus and that eventually it will have to purchase not only new planes but also extensive auxiliary facilities.

▶ **Hidden Markets**—The need for a better selling job on air cargo was a recurring theme during the panel sessions.

Joseph D. Rowland, director of cargo sales for American Airlines, warned against seeking sales only among the "natural"—seafood, baby chicks, newspapers, flowers and such—and neglecting less obvious markets.

Television sets for West Coast delivery were an out-of-the-ordinary market, he reported. Dealers in the West were reluctant to maintain the large TV stocks needed for normal business because of the high investment cost and their fear that models might change suddenly. Air freight supplied the market as it grew—and the added sales offset the air freight costs.

A growing coal manufacturer, another "hidden" customer, now uses air freight extensively and has found that costs for air freight shipments are 8 cents on $1 worth of sales compared to 14.9 cents for ground shipment, including warehousing and supplemental costs.

The air shipment of furniture to a new hotel in San Juan, Puerto Rico, was held up months only case in a paper presented by H. W. Fyfe, an PanAm's regional sales representative. Air freight delivery saved handling and warehousing costs that had to shipment expenses were lower than surface shipment would have been.

Advantages beyond fast transport are especially apparent in the long haul scale in international transport, S. E. Ross, manager of cargo sales for Trans World Airlines, reported. The hazards due to price fluctuations are lessened with air freight, he pointed out, and the gains from speed turnover of capital investment intensified.

Promotion of California grape and tree-ripened products for sale in Eastern markets was suggested as a profitable air freight item by Harry E. Kaiser, consultant to the California Aeronautics Commission.

▶ **Groundwork**—The more problems in handling cargo are not flight problems, Kaiser felt, but rather general handling, pre-transport processing, and terminal handling and transport.

Several attacks on the ground handling problem were made at the clinic. Kaiser suggested that five of the larger California air carriers furnish one empty all-cargo airplane at a California shipping point once every ten weeks. The plane would be used to carry

experimental cargoes of mature fruits and vegetables to Chicago.

Substantiating Kant's statement that flight problems in freighting fresh fruits and vegetables were relatively minor, R. Vella-Vedowa, Lockheed research engineer, reported that tests showed that normal air freight altitudes had no effect on such products.

To help improve ground handling techniques, L. R. Hackney, Lockheed air cargo sales engineer, suggested establishment of a central agency to study the improvement of air cargo handling and freight terminal facilities.

▶ **Stepchild**—Air cargo handling has been the "forgotten stepchild" in air transport, he said. Expenditures for new equipment, and studies or analyses of methods for improvement generally have been considered non-essential.

The advancement of air freight volume is being seriously retarded by this inattention, he warned, and it will continue to be until improvement of ground operation of air cargo is given equal consideration with improvement of flight operation. He advised that air transport take lessons in materials handling from ground transport agencies.

Pointers on improving ground handling were offered by John C. Sutherland, assistant sales manager of the Haslett Warehouse Co., Oakland, who called for coordination among shippers, airlines and receivers to help cut trucking costs by avoiding waste waiting time at pickups or deliveries. He also urged proper loading facilities at air terminals.

▶ **Personnel Training**—The need for proper training of personnel handling air freight was emphasized by Col. Loyd D. Bunting, former transportation officer with the Berlin Airlift. He suggested that the cargo expert of each air freight office prepare a "practical detailed operating procedure to require and emphasize personal care of each package, normal, beginning with the pickup from the premises of the consignor or receipt at the air terminal, and ending on actual delivery to the consignee."

The lack of any form of specific air shipment packaging code, such as the Consolidated Freight Classification used by the railroads, is hindering the growth of the air cargo industry, in the opinion of M. R. Barnh, manager of Fiberboard Products, San Francisco.

He had just completed a survey of Pacific Coast air cargo operations in which he noted "a flagrant use of improper packaging which would not have been permitted in the shipment of similar items by rail."

Wayne Parrish, editor and publisher of American Aviation, was the strongest advocate for realism in cost accounting.

The industry doesn't take into consideration when projecting future cargo operations the costs of the growing industry—the "investments necessary for new freight terminals, ramp space, warehouses, ground equipment, salesmen, accounts and the like."

"Air cargo has been living out of a tent but sooner or later, as the family increases, it will have to move into a house and that costs more money all around," he said.

▶ **Freight Fair**—Held in conjunction with the state's first air freight clinic was an air freight fair at the Oakland Municipal Airport, displaying new cargo craft and packaging developments.

A Boeing C-97A Stratofreighter was shown at the fair, with a forward main deck cargo door, a just-incorporated feature which is now standard with the C-97A. A "Flying Fashions" show wearing apparel as one of the larger items in the California air cargo industry's was held on a 70-ft ramp stretched between a Douglas DC-6A Liftmaster and an American Airlines DC-6.

LUXURY ALOFT

Pan American-Grace Airways is equipping two of its DC-6s with "Fiesta Lounges" such as this. Located amidships, between the forward seating compartment and the aft sleeping section, the lounge's capacity is an all-so-comfortable eight. This view is looking forward. The bar is in the lower right-hand corner.

NWA to Expand Coach Service

Northwest Airlines will soon expand its transcontinental air coach services so that both daytime and nighttime flights will be available. But the passenger is going to pay a bit more for the extra convenience.

In the past, NWA has offered only nighttime flights from New York to Seattle and from Chicago to Portland, Ore. Coast-to-coast fare was $97—about four cents a mile.

But after Sept. 6, Northwest will make one morning and one evening transcontinental air coach departure at a $110 fare (about four and one-half cents a mile). The Chicago-Portland coach will also leave during daylight hours with a $15 higher fare. Four-cents-a-mile coach rates will continue on NWA's New York-Twin Cities night coach schedules where there is competition from Capital Airlines.

▶ **Rates Equalized**—American Airlines and TWA, which also have scheduled transcontinental coach services, have been operating at the $110 tariff for some time. Coast-to-coast unscheduled carriers are generally operating at the $75-$85 level.

Meanwhile, certificated carriers whose coach tariffs expire Sept. 30 have asked the Civil Aeronautics Board to extend them to Dec. 31. Eastern Air Lines was an exception and asked for authorization to keep its coach tariffs in effect for another year—to Sept. 30, 1951.

Navigator Shortage Is News to TWU

The mystery of the missing shortage of navigators is irking the Transport Workers Union.

Last month the Civil Aeronautics

Board, without circulating the proposal or calling hearings, lowered the qualifications for airline navigators because of a reported shortage of navigators for the Pacific airlift (AVIATION WEEK Aug. 7). TWU, which speaks for the unionized navigators, and CIO, TWU's parent organization, protested to CAB, saying a hearing should be called and that there was no shortage of trained navigators. It submitted a list of names of qualified navigators now unemployed.

CAB has not replied to TWU, but last week told the CIO that a shortage existed and there was an emergency. Also last week, however, TWU was polling 250 unemployed navigators as to their availability. In four days 30 had said they were ready for airline work. TWU also asked Pan American Airways and American Overseas Airlines whether they were hiring navigators, and the answer from both was no.

French ECA Grant

The Economic Cooperation Administration has provided further help for French commercial aviation by approving a $470,000 Marshall Plan grant to Aigle Azur, a private charter company, for purchase of two used DC-4s.

The planes, together with eight spare engines and spare parts, will be bought in the U.S. They will be used on flights from France to points in Africa and Indo-China, and will permit shifting of DC-3s to inland routes, such as in French West Africa and French Equatorial Africa, where surface transportation is underdeveloped. Aigle Azur has 16 DC-3s.

SHORTLINES

▶ **Air France**—Amendment of the U.S.-French air transport agreement has given the carrier landing rights at Miami on its Caribbean routes.

▶ **Alaska Airlines**—Has received a Navy contract to ferry men and supplies from Seattle to Kodiak and Adak Island, Alaska. . . . Company has purchased Collins Air Service, operating in the Kodiak and Bristol Bay areas. Alaska Airlines is reportedly showing renewed interest in "bush" operations, previously having purchased other small carriers.

▶ **American**—A CAB examiner has recommended that AA's certificate be amended to authorize non-local all-cargo flights between Los Angeles and San Francisco/Oakland.

▶ **Australian National Airways**—Company official is in the U.S. to buy five DC-4s for his firm and Air Ceylon, in which ANA has an interest. Lacking dollars, the ANA representative hopes to get the ships with payments to be made in sterling. The ANA executive may try to get equipment in Europe if his U.S. trip is unsuccessful.

▶ **Avianca**—Plans to start weekly non-stop service between New York and Kingston, Jamaica, on Sept. 15. The Colombian carrier will use DC-4s.

▶ **Bonanza**—CAB has offered to raise the feeder's mail pay during the last half of 1950 to prevent impairment of the carrier's financial position.

▶ **Capital**—Has placed its second Super DC-3 in service. The 31-passenger craft will operate between Washington and Memphis. First of Capital's Super DC-3s started service on the Atlanta-Washington route in July.

▶ **Department of Defense**—Has established a Military Traffic Service (MTS). Purpose is to provide, under one authority, efficient and economical traffic management for Department of Defense personnel and cargo moving within continental U.S. MTS will recommend modes of carriage, prescribe routes and negotiate rates.

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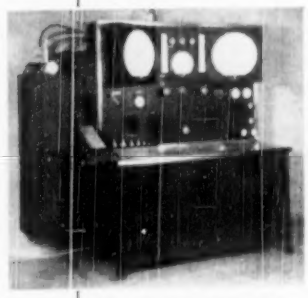

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▶ **Delta**—Claims it will need 45 percent more mail pay if CAB certificates Eastern Air Lines for a new southern route to the West Coast, as recommended recently by a Board examiner.

▶ **Economic Cooperation Administration**—Has brought a five-man team of Italian civil aviation specialists to the U.S. to make a five-month study of construction, maintenance and operation of American air fields, training of ground and flight personnel, including certification and examination of pilots, operation of flight traffic control and ground communications, and administration and management of air transportation.

▶ **Los Angeles Airways**—Has carried its 10 millionth pound of air mail on its helicopter routes. The company started service in October, 1947.

▶ **Northeast**—Reports $137,900 net income in July, compared with $116,143 in the same month last year.

▶ **Pan American**—Civil Aeronautics Board has ordered an investigation into PAA's ground transportation and pickup practices regarding Seattle cargo shipments moving to Alaska. . . . Carrier has been authorized to suspend service at Marseille, France, as long as it is allowed to serve Nice.

▶ **Slick**—Concedes that but for the Korean crisis, July might have been disastrous for its all-cargo operations. Instead, the company set new traffic records and says "the future looks bright." Slick hopes to put two more planes in service shortly and last month was negotiating for more.

▶ **Swissair**—Plans to fly its New York-Switzerland route the year around, instead of suspending flights during the winter. Company expects to have DC-6Bs in operation early next year.

CAB SCHEDULE

Sept. 6—Prehearing conference on CAB's proposed revocation of Onward Sky Freight's irregular letter of registration. (Docket 1896.)

Sept. 6—Prehearing conference on CAB investigation of Chicago-Washington service. (Docket 3666.)

Sept. 7—Prehearing conference on Modern Air Transport's application for amended and consolidated. (Docket 2431.)

Sept. 11—Prehearing conference on renewal of Wisconsin Central Airlines' feeder certificate. (Docket 1347 et al.)

Sept. 11—Hearing on Lockheed Brothers interlocking relationships and involving positions of five leading airline executives. (Docket 3661 et al.)

Sept. 11—Hearing on enforcement proceeding involving interlocking relationships of Arrow Airways, Inc., and California Airlines. (Docket 4197.)

Sept. 11—Resumption of hearing in CAB's

enforcement proceeding against Trans-American Airways. (Docket 4181)

Sept. 11—Hearing on CAB's investigation of Pan American Airways' proposed space available fare. (Docket 4505)

Sept. 11—Oral argument on service to Lumberton, N. C. (Docket 3253 et al)

Sept. 12—Prehearing conference on TWA's request to eliminate restriction on service to Albuquerque and Santa Fe. (Docket 3427)

Sept. 14—Oral argument in CAB's enforcement proceeding against Motor Air Transport. (Docket 4180)

Sept. 18—Hearing on TWA and American Overseas Airlines requests to suspend service at Philadelphia on trans-Atlantic routes. (Docket 4228 et al)

Sept. 18—Oral argument in Michigan-Wisconsin service case. (Docket 2452 et al)

Sept. 19—Prehearing conference on service to Mason City, Iowa. (Docket 3381)

Sept. 20—Prehearing conference on TWA-Continental interchange agreement. (Docket 4243)

Sept. 21—Prehearing conference on American Overseas Airlines mail rate case. (Docket 1084)

Sept. 21—Prehearing conference on Mid-Continent Airlines request to serve Lincoln, Neb. (Docket 2949)

Sept. 25—Hearing in Havana-New York foreign air carrier permit case. (Docket 3913 et al)

Oct. 3—Hearing on renewal of Frontier Airlines' feeder certificate. (Docket 3149 et al)

Oct. 9—Hearing in Latin American air freight case. (Docket 2998 et al)

Oct. 10—Oral argument on new southern service to the West. (Docket 1102 et al)

Oct. 16—Hearing on extension of Los Angeles Airways' helicopter mail certificate and additional authority to carry passengers. (Docket 3600)

Dec. 11—Hearing on CAB's investigation of West Coast passenger fare structure. (Docket 4546)

Jan. 8, 1950—Hearing in Big Four mail rate case. (Docket 2849 et al)

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LETTERS

Sperry Comments

This letter is written to call to your attention a statement made in the article in June 12, 1950, issue of AVIATION WEEK entitled "Application Extended for Zero Reader" which might be misinterpreted by your readers.

Page 24, last line of the second column reads:

"According to the Sperry Report, in order to meet these requirements, the localizer transmitter must be capable of adjustment from 1.7 to 3.5 degrees, which may or may not be possible depending on the type of equipment that is used."

It would be greatly appreciated if the following quotation from the reference report would be included with this letter in your Letters to the Editor Department.

"It should be noted that the Zero Reader type or fully automatic couplers do not demand any absolute value of sensitivity, but only require the sensitivity to remain within certain limits from site to site. Therefore, the absolute value is not determined by the automatic equipment but rather by the limits over which the localizer beam width can be varied. As an example let us examine the line ua/ft. in Figure 4. It is a simple matter to adjust the automatic coupler for optimum performance on this sensitivity; however, it is seen that the localizer transmitter must be capable of adjustment over a spread of 1.7 to 3.5 degrees, which may or may not be possible depending on the type of localizer equipment in use.

"The limits of the presently installed CAA localizers are from approximately 4 to 7 degrees. If this spread is referred to Figure 4, it is seen that it falls on the 5 ua/ft. line. Here again it is possible to adjust the approach coupler to give optimum performance at the ILS reference point with a signal of this sensitivity."

It is evident from the above quotation that no specific spread of beam widths are required in order to meet the requirements as set forth in the reference report. But rather, once the desired sensitivity in ua/ft. at the ILS reference point is established, the transmitter must be capable of sufficient adjustment to maintain this sensitivity from site to site.

Calculations show that if a sensitivity of 5 ua/ft. is established as the standard it will be possible to adjust the present CAA transmitters (which have a range of values from approximately 4 to 7 degrees) so that this standard could be achieved at the towers of the airports throughout the country.

CECIL C. PINE, Engineer-Section Head
for Flight Tests
The Sperry Gyroscope Co.
Division of the Sperry Corp.
Great Neck, L. I., N. Y.

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the head, and it begins to look as if we will need a group of intellectual "topsmen" in the future.

I especially concurred your comments of the relation of the power plant engineers to the airframe people. While the problems involved were infinitely less complex, the automotive industry went through this for many years in the conflict between the chassis engineers and the body designers. It was not until there was a pretty good meeting of minds between the two that the present automotive structure evolved.

F. E. Moskovics, Industrial Consultant
A. O. Smith Corp.
270 Park Ave.
New York 17, N. Y.

Robson Replies

The criticism of ALA's Milton Arnold published Aug. 21, of my article (AVIATION WEEK June 12) on ILS Monitoring leads me to believe that my words or intentions were misinterpreted, so my critics are misinformed.

There were three general premises presented in my article:

- That ALL aeronautical navigational radio facilities must have **automatic**, "fail-safe," monitors.
- Presently available facilities monitor components do not truly check alignment in the approach area, which is desirable and also possible.
- Radar energy of certain frequencies cannot pass through water with complete integrity.

The first premise is so obvious it should need no further explanation. Railroads proved the point years ago. The design and manufacture of a suitable monitor may well be difficult but certainly is not impossible. The problem is that they haven't been designed, manufactured and installed.

The second is also elementary. Many hours of operational use and "irregularity" studies made to date prove that the localizer wanders from its intended course in the approach area, and this deviation is not (and cannot be) detected by monitors located someplace else. Monitors **can** be located on the downwind end of the runway, high enough to receive the required signal strength and still remain below the flight path.

The third premise is, again, obvious. The entire system of weather scanning and radar radar observations is made possible by the reflection of radar pulses by water. It is precisely this characteristic that makes the detection of thunderstorms, cumulonimbus and icing levels possible. The situation is analogous to an X-ray—one sees the bones of the hand because the X-ray cannot pass through them. If radar passed through water these weather phenomena would not be seen. How then can anyone say that radar can "see" a ship behind one in all atmospheric water conditions? The criticism in Mr. Arnold's letter to ILS pilot-applicants does, besides, not. I made no mention of that.

It should also be pointed out that there is substantial disagreement between electronic experts on the exact frequencies of VHF and UHF waves to indicate that parts of the problem are not yet entirely understood.

As I am a pilot, not an electronic expert, I cannot speak from the technical or research side of the picture. My knowledge is based upon personal observation and experience. I believe the information to be true and correct and that my opinions coincide with those of many other pilots.

I will grant that the situation may have certain difficult phases especially political, but who accept a defeatist attitude? Those who have made numerous ILS approaches over a period of several years and have experienced the vagaries of the system are a lot skeptical about theoretical paper explanations that all is well. They would like something done.

R. C. Robson
5975 9th St. North
Arlington, Va.

More on Pullman

Thanks very much for your wonderful editorial about the Pullman ad. You have done for transportation a very good service. Somebody has got to try to keep the railroads on the right track.

Ten of us from the Los Angeles office have just come back from a month's tour of much of our system. We have learned a lot.

Over a portion of our system I think we are running an excellent frederine operation, probably at a much lower cost than any feeder line in the country, and making money doing it with DC-3's. It is wonderful to see the enthusiasm with which air transportation is still greeted by the citizens, particularly in these smaller western communities.

Lowell C. Dinkwater, President
Western Air Lines, Inc.
Los Angeles 45, Calif.

Congratulations on the excellent editorial you have written in the June 26 issue of AVIATION WEEK. You have expressed my own feelings regarding this stupid Pullman advertisement perfectly and you are to be commended for pointing up the responsibility that the agency must bear.

Congratulations again. I have been tempted to write to you in the past and I hope that your editorial policy remains unchanged.

R. F. Von Cecus, Sales Manager
American Aluminum Ware Co.
366-278 Jelliff Avenue
Newark 5, N. J.

Ignition Report

Congratulations on the excellent report of our recent Ignition Conference in AVIATION WEEK (June 19, 1950). This has our Ambrette helped to a great deal in the United States.

I think you may be interested to know that we have recently appointed Simmonds Aerocessory, Inc., Tarrytown, N. Y., as exclusive licensee for our aircraft products in the United States. I do not know whether this would be news, but we would very much appreciate a small notice to this effect if this could be managed.

E. M. Sutton, General Manager
Lucas Plugs Ltd.
Acton, England

WHAT'S NEW

New Books

Recommended Practices for Resistance Welding, published by the American Welding Society, represents a modification and expansion of the standard originally issued in tentative form in 1946. Included are schedules for spot and seam welding mild and medium carbon steels, low-alloy steels, stainless steels, nickel, Monel, Inconel and magnesium alloys.

Recommended projection welding practices for low-carbon and stainless steels are included. Flash welding data is given for low and medium forging strength steels.

The new peel test for testing resistance welds is discussed, as are the tension-shear method, cross and U-tension, shear drop impact, fatigue and twist tests. Copies are obtainable at $1.00 each from the society at 33 W. 39 St., N. Y. 18, N. Y.

A complete transcript of the International Air Transport Assn.'s **Symposium on Maintenance and Operation of Turbine-Powered Aircraft**, which was held at Asbury Park last May 18-19, is now available in edited form. The discussions, conducted in a question and answer basis, cover: meteorology, operations in icing, hail or rain, takeoff and landing performance; air traffic control and navigation; crew requirements; engine characteristics, engine design and maintenance; airframe design and maintenance; fuel systems; passenger comfort and safety; ground operations; costs, and conversion of existing aircraft.

The transcript, about 250 pages, is published on a non-profit basis. It costs between $5.00-$7.00 per copy depending on quantity ordered. Write the Secretary of the Technical Committee, International Aviation Building, Montreal 3, P.Q., Canada.

Trade Literature

Modern Drawing and Document Reproduction, a 16-page booklet, describes photographic materials and methods for improving legibility of reproduced engineering drawings and business papers. Obtainable from Eastman Kodak Industrial Photographic division, Rochester 4, N. Y. ... **Bulletin 66A** by Aurora Metal, Inc., details machining of Aurora metal. Company address is 1745 S. 38 St., Milwaukee 15. ... Aluminum users will be interested in a profusely illustrated, handsome book, **The A-B-C's of Aluminum**, completely describing production and uses of the metal. Write Reynolds Metals Co., 2500 So. Third St., Louisville, Ky.

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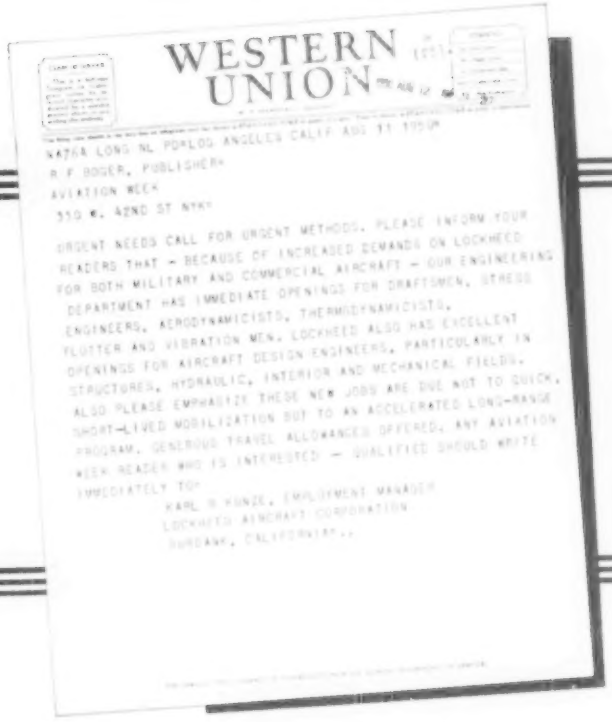

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KARL H KUNZE, EMPLOYMENT MANAGER
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BURBANK, CALIFORNIA.

EDITORIAL

Risking Death for Thrills

Hair-raising, death-defying stunts and races may attract crowds and pay off momentarily at the box office, but they are deadly enemies of commercial air transportation.

We in aviation need public confidence in our ability to attain safety. Deliberate risk of human life invites disaster. Eventually, Lady Luck turns fickle.

The most recent footnote to AVIATION WEEK's editorial series on air show safety is furnished by the United Press dispatch below, published by the New York Times:

> **12,000 SEE AIR RACE DEATH**
>
> **21-Year-Old Pilot Is Killed in Contest at Detroit**
>
> DETROIT, Aug. 11 (UP)—A 21-year-old pilot was killed today when his midget racing plane crashed before 12,000 spectators in the third heat of the $10,000 Continental Trophy Race. A wing collapsed as James Vosyka of Oak Park, Ill, rounded a pylon on the closed course at Detroit Wayne Airport.
>
> Vosyka, a flier since he was 15, was pinned in the wreckage of "The Ace of Diamonds," one of the eleven entries in the race.
>
> Last year Bill Odom died in the National Air Races at Cleveland. The Cleveland program was cancelled this year and part of it moved to Detroit to be the only major competition in 1950.

We hope there are no more such tragic footnotes. But if there are, this magazine will do everything in its power to publicize to its responsible aviation readership each such penalty for thoughtless sensationalism.

Only with safety—never with "thrills"—can you ever sell the public on air transportation.

X-1, Tribute to Engineering

One of the two history-making Bell X-1 aircraft is being presented to the Smithsonian. This is commendable. (This magazine editorially urged this presentation in June, 1948.) Despite all of the publicity the plane has won, it represents engineering accomplishments still not fully appreciated, even by people in aviation.

According to the best information available, there have been about 100 flights on the Air Force X-1, including the 20 power-on flights completed by Bell Aircraft Corp. pilots before the craft was turned over to the Air Force.

There were relatively few malfunctions in the aircraft's Reaction Motors power plant, and these were corrected with very slight modifications. Nothing has occurred at any time which would reflect on the basic design of the engines.

Although the engine design is easily seven years old, there is a firm conviction that this power plant is as reliable as the best of the present-day engines developed more recently.

Six engines were built for the two X-1 aircraft, and these were rotated between the Air Force and the NACA ships.

The X-1 has proved itself a reliable work horse. It has responded successfully to every requirement, and every test. It has flown at subsonic, transsonic and supersonic speeds in the original configuration, exactly as it came off the drawing boards. No changes other than the inconsequential hardware type have been deemed necessary.

This striking statement applies to the entire craft. Nothing basic has been altered.

This is believed to be unprecedented among aircraft. Repeated checks with the Air Force indicate that the X-1 is the only airplane in recent aviation history to complete its flight test program without a major or minor change—aerodynamically, structurally, or otherwise. This held true for its entire flight program.

If you consider that the X-1 was designed and produced to explore temperatures and stresses of which very little is known, and if you realize that the aircraft was born about seven years ago when the engineers practically threw their books and references away in conceiving this plane—you can appreciate what a real tribute this ship is to the engineers responsible.

Passengers Are Going Up!

Thanks to the Economic Planning Division of American Airlines, we offer significant data to those who study transportation trends.

Only two American railroads individually won more business from travelers last year than any one of the four major passenger-carrying airlines.

Or, put another way, four of the six rail and air carriers that do the most passenger business are airlines.

And all four airlines increased their passenger business in 1949, whereas all six railroads showed losses from 1948.

The dollar figures for the ten largest domestic carriers follow, parentheses denote percentage losses from 1948:

Passenger Revenues—Leading Airlines and Railroads

1949 Rank	1949	1948	Change From 1948
1. Pennsylvania R.R.	$149,241,345	$166,504,002	(10.3%)
2. N.Y. Central R.R.	122,451,963	136,765,197	(10.1%)
3. AMERICAN AIRLINES	84,394,300	76,344,832	11.2%
4. UNITED AIRLINES	77,248,159	69,923,568	10.4%
5. EASTERN AIRLINES	65,968,926	59,637,188	5.7%
6. TRANS WORLD AIRLINES	52,750,464	49,256,941	7.1%
7. New Haven R.R.	51,223,595	56,696,948	(11.1%)
8. Santa Fe R.R.	47,978,335	53,224,008	(10.0%)
9. Southern Pacific R.R.	39,403,923	48,519,668	(18.7%)
10. Union Pacific R.R.	32,400,954	42,109,215	(23.0%)

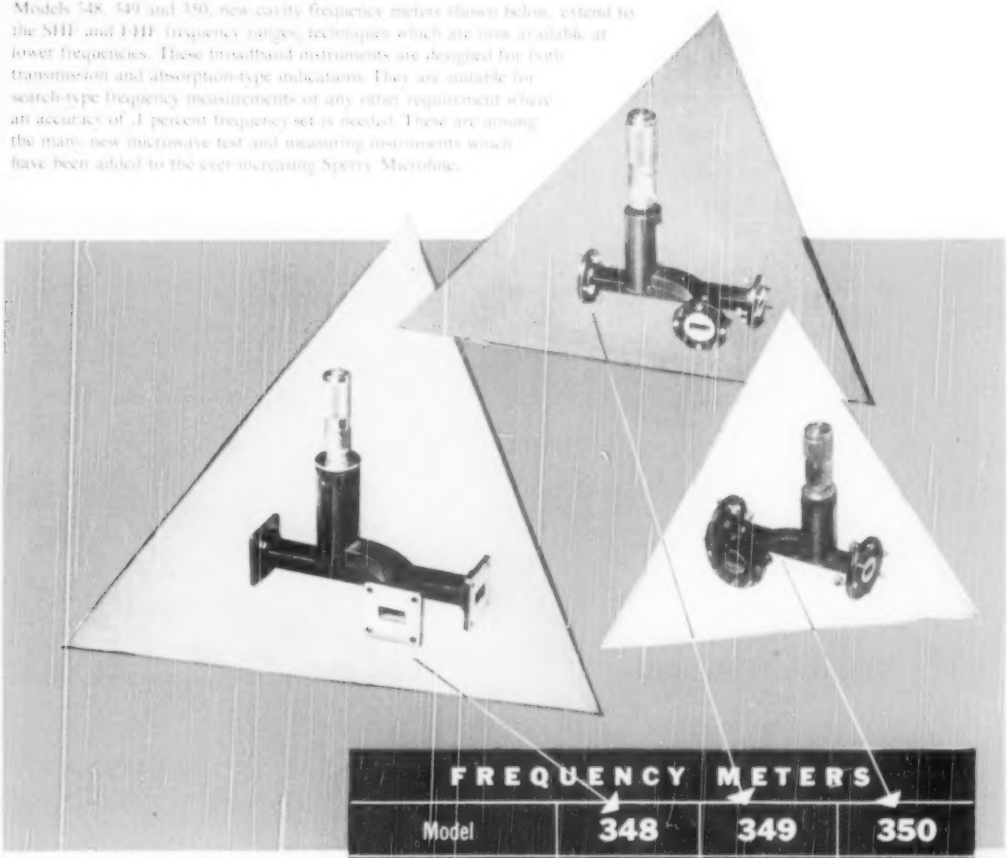
The traveler is taking to the air. Let's keep or increase the trend. Don't discourage him. Keep safety, and good service. Keep fares down. And sell, sell, sell.

—Robert H. Wood

New Instruments for Microwave Testing

COMPLEMENT SPERRY'S *Microline**

Models 348, 349 and 350, new cavity frequency meters shown below, extend to the SHF and EHF frequency ranges, techniques which are now available at lower frequencies. These broadband instruments are designed for both transmission and absorption-type indications. They are suitable for search-type frequency measurements or any other requirement where an accuracy of .1 percent frequency set is needed. These are among the many new microwave test and measuring instruments which have been added to the ever-increasing Sperry Microline.



FREQUENCY METERS			
Model	348	349	350
Description	CAVITY	CAVITY	CAVITY
Frequency Range mc	13,000-18,000	19,000-26,000	26,500-39,000
Absolute Accuracy	1/1000	1/1000	1/1000
Approximate Loaded Q	1000	450	1000
Fittings R-F	UG-419/U	UG-425/U	UG-381/U
Fittings Video	UG-419/U	UHF	UG-381/U

Ordering information on these and other Microline instruments is available on request.

*Patent Pend.

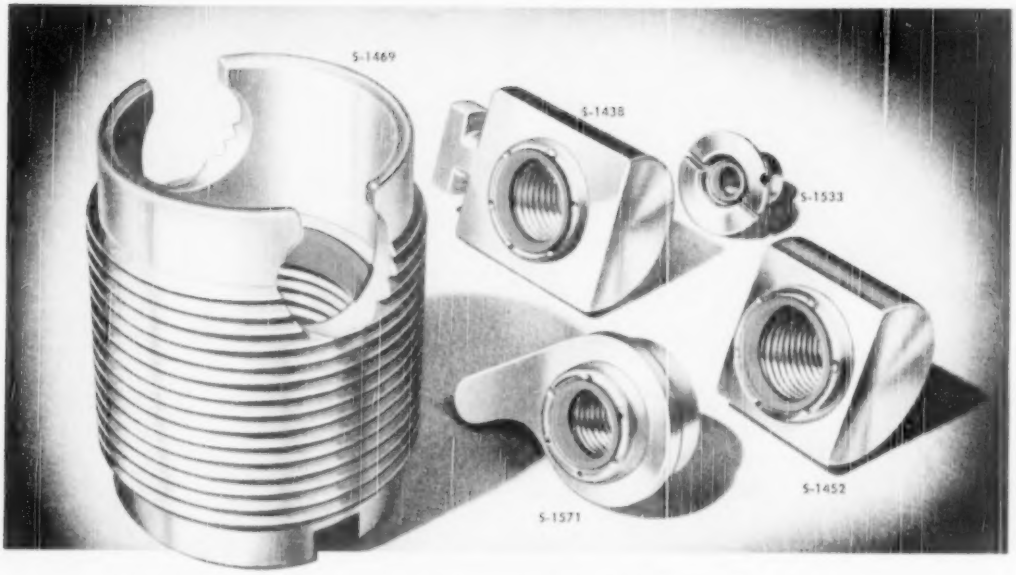
SPERRY GYROSCOPE COMPANY

DIVISION OF THE SPERRY CORPORATION, GREAT NECK, NEW YORK • CLEVELAND • NEW ORLEANS • NEW YORK • LOS ANGELES • SAN FRANCISCO • SEATTLE

Capital AIRLINES *Constellations are here!*

Fastener Problems complicated by space limitations

OVERCOME WITH ESNA SELF-LOCKING FITTINGS



—famous Red Elastic Collar . . . the ONLY self-locking nut principle readily adapted to specially designed aircraft fittings!

To help aeronautical engineers overcome fastener problems complicated by space limitations, ESNA custom builds "engineered fittings" that short-cut standard types of bolted assemblies by providing a single-unit weight-saving design!

The Elastic Stop Nuts shown above have been scientifically engineered to meet special requirements . . . S-1452 for wing outer panel to wing center section; S-1469 External-Internal threaded nut and S-1438 Trunion nut for engine mounts; S-1533 flush mounting nut for canopies and for floor and bulkhead honeycomb construction; S-1571 self-anchoring nut (single leg turns until held by structure).

But these are just five of the hundreds of special Elastic Stop Nuts designed by ESNA Engineers in cooperation with our aircraft customers . . . typical of the fastener engineering services always available to ESNA customers. And all of these special fasteners illustrate how readily the Red Elastic Collar self-locking principle adds positive protection against vibration to varied design forms.

SOLVE A CHALLENGE. If you have a weight problem where a special self-locking fitting might provide a solution, send us the details. Our Service Engineering Group is prepared to study these questions and will gladly submit their recommendations—and drawings and test samples at your request—FREE. Write Elastic Stop Nut Corporation of America, Union, N. J. Representatives and Agents are located in many principal cities.

ESNA

ELASTIC STOP NUTS

OVER 150 TYPES AND SIZES IMMEDIATELY AVAILABLE FROM STOCK